



DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[RTID 0648-XB194]

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Marine Site Characterization Surveys off of Massachusetts and Rhode Island

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; issuance of an incidental harassment authorization.

SUMMARY: In accordance with the regulations implementing the Marine Mammal Protection Act (MMPA) as amended, notification is hereby given that NMFS has issued an incidental harassment authorization (IHA) to Vineyard Wind 1 to incidentally harass, by Level B harassment only, marine mammals during marine site characterization surveys off of Massachusetts and Rhode Island in the area of Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf Lease Area OCS-A 0501 and along the Offshore Export Cable Corridor.

DATES: This Authorization is applicable for a period of one year from the date of issuance.

FOR FURTHER INFORMATION CONTACT: Leah Davis, Office of Protected Resources, NMFS, (301) 427-8401. Electronic copies of the application and supporting documents, as well as a list of the references cited in this document, may be obtained online at: <https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable>. In case of problems accessing these documents, please call the contact listed above.

SUPPLEMENTARY INFORMATION:

Background

The MMPA prohibits the “take” of marine mammals, with certain exceptions. sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*) direct the Secretary of Commerce (as delegated to NMFS) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed incidental take authorization may be provided to the public for review.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s) and will not have an unmitigable adverse impact on the availability of the species or stock(s) for taking for subsistence uses (where relevant). Further, NMFS must prescribe the permissible methods of taking and other “means of effecting the least practicable adverse impact” on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stocks for taking for certain subsistence uses (referred to in shorthand as “mitigation”); and requirements pertaining to the mitigation, monitoring and reporting of the takings are set forth.

The definitions of all applicable MMPA statutory terms cited above are included in the relevant sections below.

Summary of Request

On January 29, 2021, NMFS received a request from Vineyard Wind 1 for an IHA to take marine mammals incidental to marine site characterization surveys off of Massachusetts and Rhode Island for the 501 North wind energy project. The application was deemed adequate and complete on May 19, 2021. Vineyard Wind 1’s request is for

take of a small number of 14 species of marine mammals by Level B harassment only. Neither Vineyard Wind 1 nor NMFS expects serious injury or mortality to result from this activity and, therefore, an IHA is appropriate.

NMFS previously issued an IHA to Vineyard Wind LLC (Vineyard Wind) for similar marine site characterization surveys (85 FR 42357; July 14, 2020), and NMFS has received a request from Vineyard Wind for a renewal of that IHA.

Since issuance of Vineyard Wind's previous IHA (85 FR 42357; July 14, 2020), Vineyard Wind has split into separate corporate entities, Vineyard Wind (to which the previous IHA was issued), and Vineyard Wind 1, which holds assets associated with the 501 North wind energy project. Therefore, although the surveys analyzed in this IHA to Vineyard Wind 1 will occur in an area that overlaps with a portion of the project area included in the previous Vineyard Wind IHA and renewal of that IHA (86 FR 38296; July 20, 2021), this IHA is issued to a separate corporate entity (Vineyard Wind 1).

Description of the Specified Activity

Overview

As part of its overall marine site characterization survey operations, Vineyard Wind 1 plans to conduct high-resolution geophysical (HRG) surveys in the Lease Area and along the Offshore Export Cable Corridor (OECC) off of Massachusetts and Rhode Island.

The purpose of the marine site characterization surveys is to obtain a baseline assessment of seabed/sub-surface soil conditions in the Lease Area and cable route corridors to support the siting of potential future offshore wind projects. Underwater sound resulting from Vineyard Wind 1's planned site characterization survey activities, specifically HRG surveys, has the potential to result in incidental take of marine mammals in the form of behavioral harassment.

Dates and Duration

The total duration of survey activities will be approximately 170 survey days. Each day that a survey vessel is operating counts as a single survey day, *e.g.*, two survey vessels operating on the same day count as two survey days. This schedule is based on assumed 24-hour operations. Vineyard Wind 1 is beginning its survey activities in summer 2021, and will be continuing them for up to one year (though the actual duration will likely be shorter, particularly given the use of multiple vessels). The IHA is effective for one year from the date of issuance.

Specific Geographic Region

Vineyard Wind 1's planned survey activities will occur in the Lease Area, located approximately 24 kilometers (km) (13 nautical miles (nm)) from the southeast corner of Martha's Vineyard, and along the OECC route (landfall) in both Federal and State waters of Massachusetts (see Figure 1). The OECC routes will extend from the lease areas to shallow water areas near potential landfall locations. Water depths in the Lease Area range from about 35 to 60 meters (m; 115 to 197 feet (ft)). Water depths along the potential OECC route range from 2.5 to approximately 35 m (8 to approximately 115 ft). For the purpose of this IHA, the Lease Area and OECC are collectively referred to as the project area. The project area for this IHA overlaps with the project area for Vineyard Wind's previous IHA (85 FR 42357; July 14, 2020) for which NMFS has issued a renewal to Vineyard Wind (86 FR 38296; July 20, 2021).

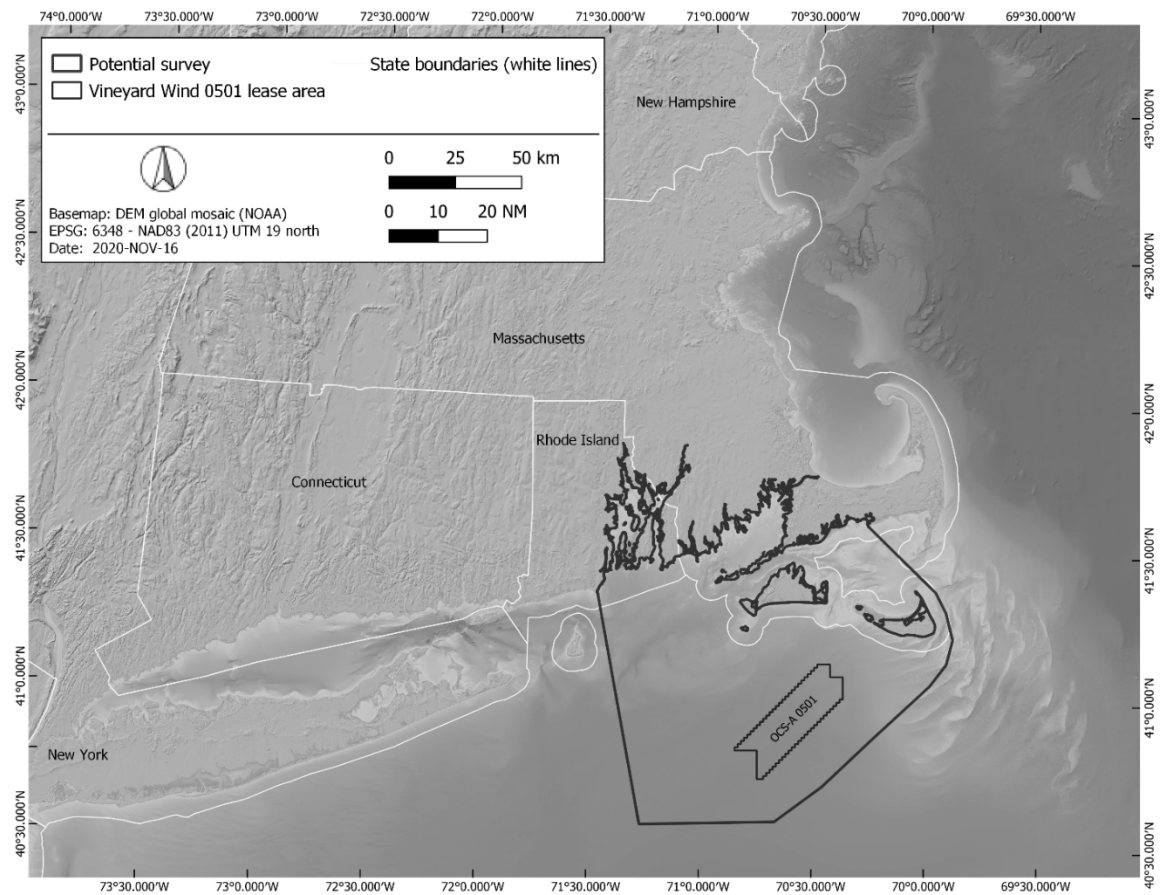


Figure 1 -- Survey Area

Detailed Description of Specific Activity

Vineyard Wind 1 plans to conduct HRG survey operations, including single and multibeam depth sounding, magnetic intensity measurements, seafloor imaging, and shallow and medium penetration sub bottom profiling. The HRG surveys may be conducted using any or all of the following equipment types: Side scan sonar, single and multibeam echosounders, magnetometers and gradiometers, parametric sub-bottom profiler (SBP), CHIRP SBP, boomers, or sparkers. HRG survey activities are anticipated to include multiple survey vessels (up to eight, depending on the season), which may operate concurrently, though surveys will be spaced to avoid geophysical interference with one another. Vineyard Wind 1 assumes that HRG survey activities will be conducted continuously 24 hours per day, with an assumed daily survey distance of 80 km (43 nm). Survey vessels will maintain a speed of approximately 4 knots (2.1 m/second) while surveying, which equates to 181 km per 24-hour period. However, based on past survey experience (*i.e.*, knowledge of typical daily downtime due to weather, system malfunctions, etc.), Vineyard Wind 1 assumes 80 km as the average daily distance.

The following acoustic sources planned for use during Vineyard Wind 1's HRG survey activities are conservatively assumed to have the potential to result in incidental take of marine mammals:

- Shallow Penetration Sub-bottom Profilers (SBP; Chirps) to map the near-surface stratigraphy (top 0 to 5 m (0 to 16 ft)) of sediment below seabed). A chirp system emits sonar pulses that increase in frequency from about 2 to 20 kHz over time. The pulse length frequency range can be adjusted to meet project variables. These sources are typically mounted on the hull of the vessel or from a side pole; and
- Medium Penetration SBPs (Boomers and Sparkers) to map deeper subsurface stratigraphy as needed. A boomer is a broadband sound source operating in the 3.5 Hz to 10 kHz frequency range. Sparkers create acoustic pulses from 50 Hz to 4

kHz omnidirectionally from the source that can penetrate several hundred meters into the seafloor. These sources are typically towed behind the vessel.

Additional acoustic sources not expected to have the potential to cause take of marine mammals were described in the notice of proposed IHA (86 FR 30266; June 7, 2021). Table 1 identifies the representative survey equipment with the expected potential to result in exposure of marine mammals and potentially result in take. The make and model of the listed survey equipment may vary depending on availability and the final equipment choices will vary depending on the final survey design, vessel availability, and survey contractor selection.

HRG surveys are expected to use several equipment types concurrently in order to collect multiple aspects of geophysical data along one transect. Selection of equipment combinations is based on specific survey objectives.

Table 1 -- Summary of Representative HRG Equipment

System	Frequency (kHz)	Beam width (°)	Pulse duration (ms)	Repetition rate (Hz)	In-beam Source Level (dB)	
					RMS	Pk
Shallow subbottom profiler (non-impulsive)						
EdgeTech Chirp 216	2–16	65	2	3.75	178	182
Deep seismic profiler (impulsive)						
Applied Acoustics AA251 Boomer	0.2–15	180	0.8	2	205	212
GeoMarine Geo Spark 2000 (400 tip)	0.05–3	180	3.4	1	203	213

Note: While many of these sources overlap with Vineyard Wind’s previous IHA (85 FR 42357; July 14, 2020), the operating parameters used as proxies in modeling some sources were changed as a result of HRG modeling recommendations from NMFS. For data source information, please see Table A-3 in Vineyard Wind 1’s application.

Required mitigation, monitoring, and reporting measures are described in detail later in this document (see **Mitigation Measures** and **Monitoring and Reporting**).

Comments and Responses

A notice of NMFS’ proposal to issue an IHA to Vineyard Wind 1 was published in the **Federal Register** on June 7, 2021 (86 FR 30266). That notice described, in detail,

Vineyard Wind 1's activity, the marine mammal species that may be affected by the activity, and the anticipated effects on marine mammals. During the 30-day comment period, NMFS received substantive comments from Oceana, and from a group of environmental non-governmental organizations (ENGOS) including the Natural Resources Defense Council, Conservation Law Foundation, National Wildlife Federation, Defenders of Wildlife, Southern Environmental Law Center, Surfrider Foundation, Mass Audubon, Friends of the Earth, International Fund for Animal Welfare, NY4WHALES, WDC Whale and Dolphin Conservation, Marine Mammal Alliance Nantucket, Gotham Whale, All Our Energy, Seatuck Environmental Association, Inland Ocean Coalition, Nassau Hiking & Outdoor Club, Connecticut Audubon Society, and Cetacean Society International. Summaries of all substantive comments, and our responses to these comments, are provided here. Please see the comment letters, available online at: <https://www.fisheries.noaa.gov/action/incidental-take-authorization-vineyard-wind-1-marine-site-characterization-surveys>, for full detail regarding the comments received.

Comment 1: The ENGOS stated that NMFS must ensure undisturbed access to foraging habitat to adequately protect North Atlantic right whales due to what the commenters describe as an energetically expensive foraging strategy. Oceana also noted the importance of the project area to North Atlantic right whales year-round, citing Oleson *et al.* (2020).

Response: As NMFS stated in the proposed IHA, part of the project area coincides directly with year-round “core” North Atlantic right whale foraging habitat (Oleson *et al.* 2020) south of Martha's Vineyard and Nantucket islands where both visual and acoustic detections of North Atlantic right whales indicate a nearly year-round presence (Oleson *et al.*, 2020). NMFS notes that prey for North Atlantic right whales are mobile and broadly distributed throughout the project area; therefore, North Atlantic right whales are

expected to be able to resume foraging once they have moved away from any areas with potentially disturbing levels of underwater noise. There is ample foraging habitat adjacent to the project area that will not be ensonified by HRG sources, such as in the Great South Channel and Georges Bank Shelf Break feeding biologically important area (BIA). Furthermore, the spatial acoustic footprint of the survey is very small relative to the spatial extent of the available foraging habitat. Finally, we have established a 500-m shutdown zone for North Atlantic right whales, which is more than twice as large as the greatest Level B harassment isopleth calculated for the specified activities for this IHA.

Comment 2: Oceana commented that the IHA must include requirements for all vessels to maintain a separation distance of at least 500 m from North Atlantic right whales at all times.

Response: NMFS agrees with Oceana and has stipulated in both the **Federal Register** notice of proposed IHA (86 FR 30266; June 7, 2021) and this final IHA that survey vessels must maintain a separation distance of 500 m or greater from any sighted Endangered Species Act (ESA)-listed whale or other unidentified large marine mammals visible at the surface.

Comment 3: The ENGOs recommended that NMFS incorporate additional data sources into calculations of marine mammal density and take and that NMFS must ensure all available data are used to ensure that any potential shifts in habitat usage by endangered and protected species and stocks are reflected in estimations of marine mammal density and take. The ENGOs asserted in general that the density models used by NMFS do not fully reflect the abundance, distribution, and density of marine mammals for the U.S. East Coast and therefore should not be the only information source relied upon when estimating take. The ENGOs note that NMFS did increase the number of Level B harassment takes of common dolphins based on the daily rate of observations of this species during surveys conducted under Vineyard Wind's previous IHA, and the

modification to the proposed Mayflower Wind IHA (May 20, 2021; 86 FR 27393). They note that NMFS compared density estimates derived from Mayflower Wind's 2020 HRG survey PSO data with those derived from the Roberts *et al.* (2016, 2017, 2018, 2020) models, and that NMFS used the larger of the take estimates as the basis for the proposed number of takes. The ENGOs state that rather than relying solely on observations previously recorded by the specific project for which authorization is currently being sought, NMFS should collectively examine PSO data from survey activities by multiple offshore wind energy projects being conducted in regional proximity (*e.g.*, off the coasts of Rhode Island and Massachusetts), as available, to inform the most conservative take estimate for each species and stock.

Response: Habitat-based density models produced by the Duke University Marine Geospatial Ecology Lab (MGEL; Roberts *et al.* 2016, 2017, 2018, 2020) represent the best available scientific information concerning marine mammal occurrence within the U.S. Atlantic Ocean. Density models were originally developed for all cetacean taxa in the U.S. Atlantic (Roberts *et al.*, 2016); more information, including the model results and supplementary information for each of those models, is available at <https://seamap.env.duke.edu/models/Duke/EC/>. These models provided key improvements over previously available information, by incorporating additional aerial and shipboard survey data from NMFS and from other organizations collected over the period 1992-2014, incorporating 60 percent more shipboard and 500 percent more aerial survey hours than did previously available models; controlling for the influence of sea state, group size, availability bias, and perception bias on the probability of making a sighting; and modeling density from an expanded set of 8 physiographic and 16 dynamic oceanographic and biological covariates. In subsequent years, certain models have been updated on the basis of additional data as well as methodological improvements. In

addition, a new density model for seals was produced as part of the 2017-18 round of model updates.

Of particular note, Roberts *et al.* (2020) further updated density model results for North Atlantic right whales by incorporating additional sighting data and implementing three major changes: increasing spatial resolution, generating monthly estimates on three time periods of survey data, and dividing the study area into 5 discrete regions. Model version nine for North Atlantic right whales—was undertaken with the following objectives (Roberts *et al.*, 2020):

- To account for recent changes to right whale distributions, the model should be based on survey data that extend through 2018, or later if possible. In addition to updates from existing collaborators, data should be solicited from two survey programs not used in prior model versions including aerial surveys of the Massachusetts and Rhode Island Wind Energy Areas led by New England Aquarium (Kraus *et al.*, 2016), spanning 2011-2015 and 2017-2018 and recent surveys of New York waters, either traditional aerial surveys initiated by the New York State Department of Environmental Conservation in 2017, or digital aerial surveys initiated by the New York State Energy Research and Development Authority in 2016, or both.
- To reflect a view in the right whale research community that spatiotemporal patterns in right whale density changed around the time the species entered a decline in approximately 2010, consider basing the new model only on recent years, including contrasting “before” and “after” models that might illustrate shifts in density, as well as a model spanning both periods, and specifically consider which model would best represent right whale density in the near future.
- To facilitate better application of the model to near-shore management questions, extend the spatial extent of the model farther in-shore, particularly north of New York.

- Increase the resolution of the model beyond 10 kilometers (km), if possible.

All of these objectives were met in developing the Version 9 update to the North Atlantic right whale density model.

As noted above, NMFS has determined that the Roberts *et al.* suite of density models represent the best available scientific information. However, NMFS acknowledges that there may be additional data that is not reflected in the models and/or that may inform our analyses, whether because the data were not available to the model authors or because the data is more recent than the latest model version for a specific taxon. Note there is now a Version 10 update to the North Atlantic right whale model which primarily focused on Massachusetts Bay, which does not overlap the project area and therefore, is not relevant to this IHA. However, Version 10 also included additional survey data in the “Hatteras Island to Nantucket Shoals” area (a portion of which does overlap the project area), which resulted in slightly higher densities in part of the project area south of Nantucket. While the difference in densities is very minor ($0.0016/\text{km}^2$ for Version 9 and $0.0018/\text{km}^2$ for Version 10), NMFS updated the take estimate for North Atlantic right whale in the final IHA to reflect the Version 10 update (see the **Estimated Take** section). A Version 11 model update is also available; however, that model update changed predictions in Cape Cod Bay only, which is outside of this project area.

The ENGOs pointed to additional data that can be obtained from sightings databases, PAM efforts, satellite telemetry, aerial surveys, and autonomous vehicles. The ENGO’s pointed specifically to monthly standardized marine mammal aerial surveys flown in the Massachusetts and Rhode Island and Massachusetts Wind Energy Areas by the New England Aquarium from October 2018 through August 2019 and March 2020 through July 2021. The 2018-2019 New England Aquarium study showed North Atlantic right whales were primarily found to the east of the Project Area although, distribution

changed seasonally, with one sighting of North Atlantic right whale in Lease area OSC-A 0501 in the spring, and no other sightings in Vineyard Wind 1's lease area during other portions of the year. Limited numbers were found north of the Lease Area in the export cable corridor route occurring between Martha's Vineyard and Nantucket heading to a landfall location in Falmouth, MA. Information on the results from the 2020-2021 aerial survey is currently unavailable. The commenters also referenced a study funded by the Bureau of Offshore Energy Management (BOEM) using an autonomous vehicle for real-time acoustical monitoring of marine mammals from December 2019 through March 2020 and again from December 2020 through February 2021 on Cox Ledge, located approximately 35 miles east of Montauk Point, New York between Block Island and Martha's Vineyard. Between December 21, 2020 and March 30, 2020 (91 days) North Atlantic right whales were acoustically detected on 13 days and possibly detected on an additional 3 days. No North Atlantic right whales were detected in BOEM's study area between March 25, 2021 and July 01, 2021 (98 days). The data from these recent studies does not indicate that NMFS should employ seasonal restrictions or alter any of the required mitigation and monitoring requirements, particularly as NMFS considers impacts from these types of survey operations to be near *de minimis* and that Vineyard Wind 1 is already required to adhere to time and area seasonal restrictions. It would be difficult to draw any qualitative conclusions from these study results given that most of the observations and detections occurred in only small portions of Vineyard Wind 1's Project Area.

Regarding common dolphins, as noted by the ENGOs, given the number of common dolphins observed in the previous Vineyard Wind IHA (monitoring report available at <https://www.fisheries.noaa.gov/action/incidental-take-authorization-vineyard-wind-llc-marine-site-characterization-surveys>), observed group sizes, and the overlap between that project area and the planned project area for this IHA, NMFS

expects that the density-based common dolphin take estimate generated for this IHA may be an underestimate, and proposed to authorize takes calculated based on the approximate daily rate of take calculated from data included in the monitoring report referenced above. NMFS determined this method was appropriate, in both the proposed IHA and this final IHA, given the large difference between the density-based estimate, and the data reported in the monitoring report referenced above. However, NMFS does not expect that such a calculation and comparison is necessary for all species in all offshore wind IHAs. NMFS agrees that consideration of PSO data from previous projects is important, but disagrees with the manner in which the data should be considered. Generally, NMFS has high confidence in the take estimates generated by the Roberts *et al.* models for the reasons stated above. In occasional instances where there is a large difference between the density-based take estimate and previous monitoring data in the same area, NMFS agrees that the previous monitoring data requires more extensive consideration. However, in most cases, particularly for species that occur in smaller groups, the Roberts *et al.* models already generates a conservative take estimate, and given the variability in location, seasonality, duration among surveys, calculation of an alternate take estimate for purposes of comparison with the density-based estimate is generally unnecessary. This is proven through review of prior monitoring reports for the region, with the aforementioned assumption of common dolphins.

NMFS will review other recommended data sources that become available to evaluate their applicability in a quantitative sense (*e.g.*, to an estimate of take numbers) and, separately, to ensure that relevant information is considered qualitatively when assessing the impacts of the specified activity on the affected species or stocks and their habitat. NMFS will continue to use the best available scientific information, and we welcome future input from interested parties on data sources that may be of use in

analyzing the potential presence and movement patterns of marine mammals, including North Atlantic right whales, in U.S. Atlantic waters.

While the ENGO's referenced the additional data discussed above, no specific recommendations were made with regard to use of this information in informing the take estimates, other than that regarding the use of data from monitoring reports associated with previous IHAs. Rather, the commenters suggested that NMFS should "collate and integrate these and more recent data sets to more accurately reflect marine mammal presence for future IHAs and other work." NMFS would welcome in the future constructive suggestions as to how these objectives might be more effectively accomplished. NMFS used the best scientific information available at the time the analyses for the proposed IHA was conducted, and has considered all available data, including sources referenced by the commenters, in reaching its determinations in support of issuance of the IHA requested by Vineyard Wind 1.

Comment 4: The ENGOs state that NMFS proposes to estimate take based on annual mean density estimates for each species and stock. They assert that by averaging monthly density estimates across the entire year, the nuances of North Atlantic right whale migration, including the elevated density expected during the winter and spring months off Rhode Island and Massachusetts, remain unaccounted for. The commenters assert that this approach will likely lead to inaccurate take estimates and that this approach runs counter to how NMFS has approached calculating take in other recent authorizations. For example, in the modification of the proposed IHA for Mayflower Wind, LLC (May 20, 2021; 86 FR 27393), the potential number of monthly takes were calculated by multiplying the monthly density for each species by the ensonified survey area for the corresponding month, and then summed to produce the total density-based calculated take. The commenters state that this approach more accurately captures variation in density across the year. The ENGOs ask NMFS to recalculate Level B

harassment take in the proposed IHA to reflect the sum of monthly take estimates for the North Atlantic right whale, as well as other species. Further, the ENGOs reiterate the requests their groups have previously made that NMFS standardize its approach to take estimation and mitigation requirements across all authorizations related to offshore wind energy.

Response: NMFS recognizes that the density of North Atlantic right whales, as well as other species, varies by month. In some cases, it is appropriate to calculate a monthly take estimate by multiplying the monthly density for a species by the respective monthly ensonified area, as was done in NMFS' recent modified proposed IHA for Mayflower Wind, LLC (May 20, 2021; 86 FR 27393). However, for this IHA, Vineyard Wind 1 does not know how much survey activity will occur in which months, other than the seasonal restrictions included in this IHA. Therefore, in order to conduct a parallel analysis to that included in the modified proposed Mayflower IHA, one would theoretically assume equal survey activity in each month, in which case the density-based take estimate would not change. Further, if one did attempt to consider the likelihood of less survey activity due to the seasonal restrictions in such a calculation, that would result in a less-conservative take estimate for North Atlantic right whales.

Given the variability in proposed survey activities, and differences in available information sources for various projects, a standardized approach to take estimation would not always reflect the best available science, and therefore, NMFS does not use a standardized approach for all authorizations for offshore wind energy. NMFS considers the most appropriate approach to take estimation as well as the mitigation necessary to effect the least practicable adverse impact on the affected species or stocks on a case-by-case basis.

Comment 5: Oceana asserted that NMFS must use the best available science for assessing North Atlantic right whale abundance estimates. They state that North Atlantic

right whales have experienced significant declines in the last decade and that NMFS should use the most recent population estimate to support the IHA, which they state is the Pettis *et al.* (2020) estimate of 356 North Atlantic right whales. They commented that this estimate is nearly 14 percent lower than the estimate NMFS used in the analysis to support previous IHAs for Vineyard Wind.

Response: NMFS agrees that the best available science should be used for assessing North Atlantic right whale abundance estimates in the IHA, but disagrees that the Pettis *et al.* (2020) study represents the most recent and best available estimate for North Atlantic right whale abundance. Rather the revised abundance estimate published by Pace (2021), which was used in the proposed IHA, provides the most recent and best available estimate, and suggests improvements to the model currently used to estimate North Atlantic right whale abundance. Specifically, Pace (2021) looked at a different way of characterizing annual estimates of age-specific survival. The results strengthened the case for a change in mean survival rates after 2010-2011, but did not significantly change other current estimates (population size, number of new animals, adult female survival) derived from the model. The estimate reported by Pace (2021) and used in the **Federal Register** notice of proposed IHA (86 FR 30266; June 7, 2021) and in this final IHA is 368 (95% CI 356-378) whales. Of note, the estimate proposed by Pettis *et al.* (2020) of 356 right whales is only three percent, not 14 percent, lower than this newly available estimate, which NMFS has determined is the most appropriate estimate to use.

Comment 6: The ENGOs recommended that NMFS require the implementation of seasonal restrictions on site characterization activities that have the potential to injure or harass the North Atlantic right whales from December 1, 2021 through April 30, 2022. The ENGOs further note that they consider source levels greater than 180 dB re 1 μ Pa (SPL) at 1-meter at frequencies between 7 Hz and 35 kHz to be potentially harmful to low-frequency cetaceans.

Response: NMFS is concerned about the status of the North Atlantic right whale, given that a UME has been in effect for this species since June of 2017 and that there have been a number of recent mortalities. NMFS appreciates the value of seasonal restrictions under some circumstances. However, in this case, we have determined additional seasonal restrictions are not warranted since NMFS considers impacts from these types of survey operations to be near *de minimis*. In particular, and as detailed in the notice of proposed IHA, the available evidence supports a conclusion that no injury to right whales (or any species) is likely to occur as a result of the proposed activity, regardless of mitigation.

NMFS, however, is requiring Vineyard Wind 1 to operate no more than three concurrent HRG survey vessels, with HRG survey equipment operating at or below 180 kHz, from January through April within the lease area or export cable corridor, not including coastal and bay waters. NMFS is also requiring Vineyard Wind 1 to comply with restrictions associated with identified seasonal management areas (SMAs) and with dynamic management areas (DMAs) and Slow Zones, if any are established near the project area. Furthermore, we have established a 500-m shutdown zone for North Atlantic right whales, which is more than twice as large as the greatest Level B harassment isopleth calculated for the specified activities for this IHA (178 m). Take estimation conservatively assumes that these acoustic sources will operate on all survey days although it is probable that Vineyard Wind 1 will only use boomers on a subset of survey days, and on the remaining days utilize HRG equipment with smaller Level B harassment isopleths and overall less potential to cause disturbance. Therefore, the number of Level B harassment takes is likely an overestimate. Finally, significantly shortening Vineyard Wind 1's work season is impracticable given the number of survey days planned for the specified activity for this IHA.

It is unclear how the commenters determined that source levels greater than 180 dB re 1 μ Pa (SPL) are potentially harmful to low-frequency cetaceans. NMFS historically applied a received level (RL; not source level) root mean square (rms) threshold of 180 dB SPL as the potential for marine mammals to incur PTS (*i.e.*, Level A (injury) harassment); however, in 2016, NMFS published its *Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing* which updated the 180 dB SPL Level A harassment threshold. Since that time, NMFS has been applying dual threshold criteria based on both peak and a weighted (to account for marine mammal hearing) cumulative sound exposure level. NMFS released a revised version of the Technical Guidance in 2018. The 2018 Technical Guidance is available at <https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance>. As described in the **Estimated Take** section, NMFS has established a PTS (Level A harassment) threshold of 183 dB cumulative SEL for low frequency specialists, and a right whale would need to approach within 1 meter of the source to potentially incur PTS from the largest source.

Comment 7: Oceana suggested that NMFS should fully consider both the use of the area and the effects of both acute and chronic stressors on the health and fitness of North Atlantic right whales. Oceana states that chronic stressors are an emerging concern for North Atlantic right whale conservation and recovery and that a recent peer-reviewed study suggests that a range of stresses on North Atlantic right whales have stunted growth rates (Stewart *et al.*, 2021). Oceana asserted that disruptive site characterization activities may do more than startle or spook North Atlantic right whales in this area and may cause chronic stress to the whales or cause the whales to seek other feeding areas at great energetic cost, decreasing their fitness, body condition and ability to successfully feed, socialize and mate.

Response: NMFS agrees with Oceana that both acute and chronic stressors are of concern for North Atlantic right whale conservation and recovery. We recognize that acute stress from acoustic exposure is one potential impact of these surveys, and that chronic stress can have fitness, reproductive, *etc.* impacts at the population-level scale. NMFS has carefully reviewed the best available scientific information in assessing impacts to marine mammals, and recognizes that the surveys have the potential to impact marine mammals through behavioral effects, stress responses, and auditory masking. However, NMFS does not expect that the generally short-term, intermittent, and transitory marine site characterization survey activities would create conditions of acute or chronic acoustic exposure leading to long-term physiological stress responses in marine mammals. NMFS has also prescribed a robust suite of mitigation measures, such as time-area limitations and extended distance shutdowns for certain species that are expected to further reduce the duration and intensity of acoustic exposure, while limiting the potential severity of any possible behavioral disruption. The potential for chronic stress was evaluated in making the determinations presented in NMFS's negligible impact analyses.

Comment 8: Oceana asserted that NMFS must fully consider the discrete effects of each activity and the cumulative effects of the suite of approved, proposed and potential activities on marine mammals and North Atlantic right whales in particular and ensure that the cumulative effects are not excessive before issuing or renewing an IHA. They noted that this was specifically important given the large number of offshore wind-related activities being considered in the northeast region.

Response: Neither the MMPA nor NMFS' codified implementing regulations call for consideration of other unrelated activities and their impacts on populations. The preamble for NMFS' implementing regulations (54 FR 40338; September 29, 1989) states in response to comments that the impacts from other past and ongoing anthropogenic

activities are to be incorporated into the negligible impact analysis via their impacts on the baseline. Consistent with that direction, NMFS has factored into its negligible impact analysis the impacts of other past and ongoing anthropogenic activities via their impacts on the baseline, *e.g.*, as reflected in the density/distribution and status of the species, population size and growth rate, and other relevant stressors. The 1989 implementing regulations also addressed public comments regarding cumulative effects from future, unrelated activities. There NMFS stated that such effects are not considered in making findings under section 101(a)(5) concerning negligible impact. In this case, both this IHA, as well as other IHAs currently in effect or proposed within the specified geographic region, are appropriately considered an unrelated activity relative to the others. The IHAs are unrelated in the sense that they are discrete actions under section 101(a)(5)(D), issued to discrete applicants.

Section 101(a)(5)(D) of the MMPA requires NMFS to make a determination that the take incidental to a “specified activity” will have a negligible impact on the affected species or stocks of marine mammals. NMFS’ implementing regulations require applicants to include in their request a detailed description of the specified activity or class of activities that can be expected to result in incidental taking of marine mammals. 50 CFR 216.104(a)(1). Thus, the “specified activity” for which incidental take coverage is being sought under section 101(a)(5)(D) is generally defined and described by the applicant. Here, Vineyard Wind 1 was the applicant for the IHA, and we are responding to the specified activity as described in that application (and making the necessary findings on that basis). Through the response to public comments in the 1989 implementing regulations, we also indicated (1) that NMFS would consider cumulative effects that are reasonably foreseeable when preparing a NEPA analysis, and (2) that reasonably foreseeable cumulative effects would also be considered under section 7 of the ESA for ESA-listed species. In this case, cumulative impacts have been adequately

addressed under NEPA in prior environmental analyses that form the basis for NMFS' determination that this action is appropriately categorically excluded from further NEPA analysis.

NMFS has previously written Environmental Assessments (EA) that addressed cumulative impacts related to substantially similar activities, in similar locations, *e.g.*, 2019 Ørsted EA for survey activities offshore southern New England; 2019 Avangrid EA for survey activities offshore North Carolina and Virginia; 2018 Deepwater Wind EA for survey activities offshore Delaware, Massachusetts, and Rhode Island. Separately, cumulative effects have been analyzed as required through NMFS' required intra-agency consultation under section 7 of the ESA for substantially similar activities, in similar locations (*e.g.*, the 2013 programmatic Biological Opinion for BOEM Lease and Site Assessment Rhode Island, Massachusetts, New York, and New Jersey Wind Energy Areas, and the programmatic consultation completed by NMFS Greater Atlantic Regional Fisheries Office (GARFO) on June 29, 2021), under which GARFO has determined multiple times that NMFS' action of issuing IHAs is not likely to adversely affect listed marine mammals or their critical habitat.

Comment 9: The ENGO's noted that harbor porpoises are particularly sensitive to noise, and, therefore, impacts to this species must be minimized and mitigated to the full extent practicable during offshore wind siting and development activities in the waters off the coast of Massachusetts and Rhode Island where this species regularly occurs.

Response: Harbor porpoises are classified as high-frequency cetaceans (NMFS, 2018) and are the hearing group with the lowest PTS onset thresholds, with maximum susceptibility to frequencies between 20 and 40 kHz (susceptibility decreases with outside this frequency range). However, the largest modeled distance to the Level A harassment threshold for any impulsive source for HF cetaceans was 53 m. Level A harassment would also be more likely to occur at close approach to the sound source or as

a result of longer duration exposure to the sound source, and mitigation measures—including a 100 m exclusion zone (EZ) for harbor porpoises—are expected to minimize the potential for close approach or longer duration exposure to active HRG sources. In addition, harbor porpoises are known to be behaviorally sensitive species, in that they respond to comparatively lower RLs and are known to avoid vessels and other sound sources and, therefore, harbor porpoises would also be expected to avoid a sound source prior to that source reaching a level that would result in injury (Level A harassment). Therefore, NMFS has determined that take of harbor porpoises or any other animal by Level A harassment is unlikely to occur and has not authorized any such takes. Any takes by Level B harassment are anticipated to be limited to brief startling reactions and/or temporary avoidance of the project area. Further, appropriate mitigation measures have been included to ensure the least practicable adverse impact on harbor porpoises and other marine mammal species, and no harbor porpoises were observed by Vineyard Wind in their 2020-2021 year of survey activities according to their preliminary monitoring report (<https://www.fisheries.noaa.gov/action/incidental-take-authorization-vineyard-wind-llc-marine-site-characterization-surveys>).

Comment 10: The ENGOs recommended that geophysical surveys commence, with ramp up, only during daylight hours and periods of good visibility to maximize the probability that marine mammals are detected and confirmed clear of the exclusion zone before activities begin. If the activities are halted or delayed because of documented or suspected North Atlantic right whale presence in the area, the ENGOs recommend that NMFS should require Vineyard Wind 1 to wait until daylight hours and good visibility conditions to recommence survey activities.

Response: NMFS acknowledges the limitations inherent in detection of marine mammals at night. However, no injury is expected to result even in the absence of mitigation, given the characteristics of the sources planned for use (supported by the very

small estimated Level A harassment zones; *i.e.*, < 53 m for all impulsive sources). The ENGOs do not provide any support for the apparent contention that injury is a potential outcome of these activities. Regarding Level B harassment, any potential impacts would be limited to short-term behavioral responses, as described in greater detail herein. The commenters establish that the status of North Atlantic right whales in particular is precarious. NMFS agrees in general with the discussion of this status provided by the commenters. Note that NMFS considers impacts from this category of survey operations to be near *de minimis*, with the potential for Level A harassment for any species to be discountable and the severity of Level B harassment (and, therefore, the impacts of the take event on the affected individual), if any, to be low. Commenters provide no evidence to the contrary. NMFS is also requiring Vineyard Wind 1 to employ a PSO during nighttime hours who must have access to night-vision equipment (*i.e.*, night-vision goggles and/or infrared technology). Given these factors, NMFS has determined that more restrictive mitigation requirements are not warranted.

Restricting surveys in the manner suggested by the commenters may reduce marine mammal exposures by some degree in the short term, but would not result in any significant reduction in either intensity or duration of noise exposure. Vessels would also potentially be on the water for an extended time introducing noise into the marine environment. The restrictions recommended by the commenters could result in the surveys spending increased time on the water, which may result in greater overall exposure to sound for marine mammals; thus the commenters have not demonstrated that such a requirement would result in a net benefit. Furthermore, restricting the ability of the applicant to begin operations only during daylight hours would have the potential to result in lengthy shutdowns of the survey equipment, which could result in the applicant failing to collect the data they have determined is necessary and, subsequently, the need to conduct additional surveys in the future. This would result in significantly increased

costs incurred by the applicant. Thus the restriction suggested by the commenters would not be practicable for the applicant to implement. In consideration of the likely effects of the activity on marine mammals absent mitigation, potential unintended consequences of the measures as proposed by the commenters, and practicability of the recommended measures for the applicant, NMFS has determined that restricting operations as recommended is not warranted or practicable in this case.

Comment 11: The ENGOs noted that NMFS states that shutdown, pre-start clearance, and ramp-up procedures are not required during HRG survey operations using only non-impulsive sources (*e.g.*, USBL and parametric sub-bottom profilers) other than non-parametric sub-bottom profilers (*e.g.*, CHIRPs), and also that pre-clearance and ramp-up, but not shutdown, are required when using non-impulsive, non-parametric sub-bottom profilers. The ENGOs stated that NMFS should provide a detailed rationale for these requirements in the proposed IHA so they can be more easily understood and evaluated by the public.

Response: As noted in the *Detailed Description of Specific Activity* section of the notice of the proposed IHA (86 FR 30266; June 7, 2021), NMFS does not expect that sources planned for use by Vineyard Wind 1, other than the shallow penetration sub-bottom profilers (SBP; Chirps) and medium penetration SBPs (Boomers and Sparkers), will result in take of marine mammals, regardless of mitigation. As stated in that section, operation of the following survey equipment types is not reasonably expected to present risk of marine mammal take for the reasons provided below:

- Parametric SBPs, also called sediment echosounders, for providing high data density in sub-bottom profiles that are typically required for cable routes, very shallow water, and archaeological surveys. These sources generate short, very narrow-beam (1° to 3.5°) signals at high frequencies (generally around 85-100 kHz). The narrow beamwidth significantly reduces the potential that a marine mammal could be exposed to

the signal, while the high frequency of operation means that the signal is rapidly attenuated in seawater. These sources are typically mounted on the hull of the vessel or from a side pole rather than towed behind the vessel;

- Ultra-Short Baseline (USBL) positioning systems are used to provide high accuracy ranges by measuring the time between the acoustic pulses transmitted by the vessel transceiver and the equipment transponder (or beacon) necessary to produce the acoustic profile. It is a two-component system with a hull or pole mounted transceiver and one or several transponders either on the seabed or on the equipment. USBLs are expected to produce extremely small acoustic propagation distances in their typical operating configuration;

- Single beam and Multibeam Echosounders (MBESs) to determine water depths and general bottom topography. The proposed single beam and MBES all have operating frequencies >180 kHz and are therefore outside the general hearing range of marine mammals;

- Side-scan Sonar (SSS) is used for seabed sediment classification purposes and to identify natural and man-made acoustic targets on the seafloor. The proposed SSSs all have operating frequencies >180 kHz and are therefore outside the general hearing range of marine mammals; and

- Magnetometer/Gradiometer has an operating frequency >180 kHz and is therefore outside the general hearing range of marine mammals.

Therefore, it is not necessary to implement shutdown, pre-start clearance, and ramp-up procedures during the use of those other sources in order to mitigate impacts to marine mammals from those sources, as none are expected. Additionally, shutdown is not required during use of non-impulsive, non-parametric sub-bottom profilers given the very small Level B harassment zones expected from use of those sources (4.3 m for the EdgeTech Chirp 216 planned for use by Vineyard Wind 1). However, we note that

Vineyard Wind 1 is still required to implement the vessel strike avoidance measures during use of these sources.

Comment 12: Oceana recommended that when HRG surveys are safe to resume after a shutdown event, the surveys should be required to use a ramp-up procedure to encourage any nearby marine life to leave the area.

Response: NMFS agrees with this recommendation and included in the **Federal Register** notice of the proposed IHA (86 FR 30266, June 7, 2021) and this final IHA a stipulation that when technically feasible, survey equipment must be ramped up at the start or restart of survey activities. Ramp-up must begin with the power of the smallest acoustic equipment at its lowest practical power output appropriate for the survey. When technically feasible the power must then be gradually turned up and other acoustic sources added in a way such that the source level would increase gradually.

Comment 13: Based on the assertion that the 160 dB threshold for behavioral harassment is not supported by best available scientific information and grossly underestimates Level B harassment take, the ENGOs recommended that NMFS establish an EZ of 1,000 m around each vessel conducting activities with noise levels that they assert could result in injury or harassment to North Atlantic right whales, and a minimum EZ of 500 m for all other large whale species and strategic stocks of small cetaceans. Oceana recommended a 1,000 m exclusion zone for North Atlantic right whales also. The ENGOs further noted that they consider source levels greater than 180 dB re 1 μ Pa (SPL) at 1-meter at frequencies between 7 Hz and 35 kHz to be potentially harmful to low-frequency cetaceans.

Response: NMFS disagrees with this recommendation and the assertion that the 160 dB threshold for behavioral harassment grossly underestimates take by Level B harassment. NMFS acknowledges that the potential for behavioral response to an anthropogenic source is highly variable and context-specific and acknowledges the

potential for Level B harassment at exposures to RLs below 160 dB rms. Alternatively, NMFS acknowledges the potential that not all animals exposed to RLs above 160 dB rms will respond in ways constituting behavioral harassment. There are a variety of studies indicating that contextual variables play a very important role in response to anthropogenic noise, and the severity of effects are not necessarily linear when compared to a RL. The commenters cited several studies (Nowacek *et al.*, 2004; Kastelein *et al.*, 2012 and 2015; Gomez *et al.*, 2016; Tyack & Thomas, 2019) that showed there were behavioral responses to sources below the 160 dB threshold, but also acknowledge the importance of context in these responses. For example, Nowacek *et al.*, 2004 reported the behavior of five out of six North Atlantic right whales was disrupted at RLs of only 133-148 dB re 1 μ Pa (returning to normal behavior within minutes) when exposed to an alert signal. However, the authors also reported that none of the whales responded to noise from transiting vessels or playbacks of ship noise even though the RLs were at least as strong, and contained similar frequencies, to those of the alert signal. The authors state that a possible explanation for why whales responded to the alert signal and did not respond to vessel noise is that the whales may have been habituated to vessel noise, while the alert signal was a novel sound. In addition, the authors noted differences between the characteristics of the vessel noise and alert signal which may also have played a part in the differences in responses to the two noise types. Therefore, it was concluded that the signal itself, as opposed to the RL, was responsible for the response. DeRuiter *et al.* (2013) also indicate that variability of responses to acoustic stimuli depends not only on the species receiving the sound and the sound source, but also on the social, behavioral, or environmental contexts of exposure. Finally, Gong *et al.* (2014) highlighted that behavioral responses depend on many contextual factors, including range to source, RL above background noise, novelty of the signal, and differences in behavioral state. Similarly, Kastelein *et al.*, 2015 (cited in the letter) examined behavioral responses of a

harbor porpoise to sonar signals in a quiet pool, but stated behavioral responses of harbor porpoises at sea would vary with context such as social situation, sound propagation, and background noise levels.

NMFS uses 160 dB (rms) as the exposure level for estimating Level B harassment takes, while acknowledging that the 160 dB rms step-function approach is a simplistic approach. The commenters suggested that our use of the 160-dB threshold implies that we do not recognize the science indicating that animals may react in ways constituting behavioral harassment when exposed to lower RLs. However, we do recognize the potential for Level B harassment at exposures to RLs below 160 dB rms, in addition to the potential that animals exposed to RLs above 160 dB rms will not respond in ways constituting behavioral harassment (*e.g.*, Malme *et al.*, 1983, 1984, 1985, 1988; McCauley *et al.*, 1998, 2000a, 2000b; Barkaszi *et al.*, 2012; Stone, 2015a; Gailey *et al.*, 2016; Barkaszi and Kelly, 2018). These comments appear to evidence a misconception regarding the concept of the 160-dB threshold. While it is correct that in practice it works as a step-function, *i.e.*, animals exposed to received levels above the threshold are considered to be “taken” and those exposed to levels below the threshold are not, it is in fact intended as a sort of mid-point of likely behavioral responses (which are extremely complex depending on many factors including species, noise source, individual experience, and behavioral context). What this means is that, conceptually, the function recognizes that some animals exposed to levels below the threshold will in fact react in ways that are appropriately considered take, while others that are exposed to levels above the threshold will not. Use of the 160-dB threshold allows for a simplistic quantitative estimate of take, while we can qualitatively address the variation in responses across different received levels in our discussion and analysis.

Overall, we emphasize the lack of scientific consensus regarding what criteria might be more appropriate. Defining sound levels that disrupt behavioral patterns is

difficult because responses depend on the context in which the animal receives the sound, including an animal's behavioral mode when it hears sounds (*e.g.*, feeding, resting, or migrating), prior experience, and biological factors (*e.g.*, age and sex). Other contextual factors, such as signal characteristics, distance from the source, and signal to noise ratio, may also help determine response to a given received level of sound. Therefore, levels at which responses occur are not necessarily consistent and can be difficult to predict (Southall *et al.*, 2007; Ellison *et al.*, 2012; Bain and Williams, 2006). Even experts have not previously been able to suggest specific new criteria due to these difficulties (*e.g.*, Southall *et al.* 2007; Gomez *et al.*, 2016). Further, we note that the sound sources and the equipment used in the specified activities are outside (higher than) the most sensitive range of mysticete hearing.

There is currently no agreement on these complex issues, and NMFS followed the practice at the time of submission and review of this analysis in assessing the likelihood of disruption of behavioral patterns by using the 160 dB threshold. This threshold has remained in use in part because of the practical need to use a relatively simple threshold based on available information that is both predictable and measurable for most activities. We note that the seminal review presented by Southall *et al.* (2007) did not suggest any specific new criteria due to lack of convergence in the data. NMFS is currently evaluating available information towards development of guidance for assessing the effects of anthropogenic sound on marine mammal behavior, such as a dose-response curve presented by Tyack and Thomas (2017) and referenced by the commenters. However, undertaking a process to derive defensible exposure-response relationships is complex (*e.g.*, NMFS previously attempted such an approach, but is currently re-evaluating the approach based on input collected during peer review of NMFS (2016)). A recent systematic review by Gomez *et al.* (2016) referenced by the commenters was unable to

derive criteria expressing these types of exposure-response relationships based on currently available data.

NMFS acknowledges that there may be methods of assessing likely behavioral response to acoustic stimuli that better capture the variation and context-dependency of those responses than the simple 160 dB step-function used here, and that an approach reflecting a more complex probabilistic function may more effectively represent the known variation in responses at different levels due to differences in the receivers, the context of the exposure, and other factors. However, there is no agreement on what that method should be or how more complicated methods may be implemented by applicants. NMFS is committed to continuing its work in developing updated guidance with regard to acoustic thresholds, but pending additional consideration and process is reliant upon an established threshold that is reasonably reflective of available science.

Regarding the shutdown zone recommendation, we note that the 500-m EZ for North Atlantic right whales exceeds the modeled distance to the largest 160-dB Level B harassment isopleth distance (178 m) by a substantial margin. Given that calculated Level B harassment isopleths are likely conservative, and NMFS considers impacts from HRG survey activities to be near *de minimis*, a 100-m shutdown for other marine mammal species (including large whales and strategic stocks of small cetaceans) is sufficiently protective to effect the least practicable adverse impact on those species and stocks. Further, no injury is expected to result even in the absence of mitigation, given the characteristics of the sources planned for use (supported by the very small estimated Level A harassment zones; *i.e.*, < 53 m for all impulsive sources).

Comment 14: Oceana recommended that a shutdown of HRG equipment be required should a North Atlantic right whale or other protected species enter an EZ, unless necessary for human safety. They further recommended that if and when such an exemption occurs the project must immediately notify NMFS with reasons and

explanation for exemption and a summary of the frequency of these exceptions must be publicly available to ensure that these are the exception rather than the norm for the project.

Response: There are several shutdown requirements described in the **Federal Register** notice of the proposed IHA (86 FR 30266, June 7, 2021), and which are included in this final IHA, including the stipulation that geophysical survey equipment must be immediately shut down if any marine mammal is observed within or entering the relevant EZs while geophysical survey equipment is operational. There is no exemption for human safety and it is unclear what exemption the commenter is referring to. In regards to reporting, Vineyard Wind 1 must notify NMFS if a North Atlantic right whale is observed at any time by any project vessels during surveys or during vessel transit. Additionally, Vineyard Wind 1 is required to report the relevant survey activity information, such as the type of survey equipment in operation, acoustic source power output while in operation, and any other notes of significance (*i.e.*, pre-clearance survey, ramp-up, shutdown, end of operations, *etc.*) as well as the estimated distance to an animal and its heading relative to the survey vessel at the initial sighting and survey activity information. As documented in Vineyard Wind's preliminary monitoring report for the surveys completed under the previous 2020-2021 IHA (report available on our website at <https://www.fisheries.noaa.gov/action/incidental-take-authorization-vineyard-wind-llc-marine-site-characterization-surveys>), except for excepted instances of voluntary approaches by delphinids, there were no instances where marine mammals were observed within the required shutdown zone and shutdown procedures were not implemented. If a right whale is detected within the EZ before a shutdown is implemented, the right whale and its distance from the sound source, including whether it is within the Level B or Level A harassment zones, would be reported in Vineyard Wind 1's final monitoring report and made publicly available on NMFS' website. Vineyard

Wind 1 is required to immediately notify NMFS of any sightings of North Atlantic right whales and report upon survey activity information.

Comment 15: The ENGOs recommended that passive acoustic monitoring (PAM) operators for this and future wind development projects should be part of a migratory corridor-wide network of passive acoustic monitors organized by NOAA and BOEM in collaboration with state governments as well as private, academic, and non-profit partners. They also recommended that NMFS should also advance a robust and effective near real-time monitoring and mitigation system for North Atlantic right whales and other endangered and protected species that will be more responsive to the ongoing dynamic species distributional shifts resulting from climate change, as well as provide more flexibility to developers.

Response: NMFS is generally supportive of these concepts. A network of near real-time baleen whale monitoring devices are active or have been tested in portions of New England and Canadian waters. These systems employ various digital acoustic monitoring instruments which have been placed on autonomous platforms including slocum gliders, wave gliders, profiling floats and moored buoys. Systems that have proven to be successful will likely see increased use as operational tools for many whale monitoring and mitigation applications. In 2020, NMFS convened a workshop to address objectives related to monitoring North Atlantic right whales. The NMFS publication “Technical Memorandum NMFS-OPR-64: North Atlantic Right Whale Monitoring and Surveillance: Report and Recommendations of the National Marine Fisheries Service's Expert Working Group”, available at: <https://www.fisheries.noaa.gov/resource/document/north-atlantic-right-whale-monitoring-and-surveillance-report-and-recommendations>, summarizes information from the workshop and presents the Expert Working Group's recommendations for a comprehensive monitoring strategy to guide future analyses and data collection. Among the numerous recommendations found in the report, the Expert

Working Group encouraged the widespread deployment of auto-buoys to provide near real-time detections of North Atlantic right whale calls that visual survey teams can then respond to for collection of identification photographs or biological samples.

In regards to the current IHA, NMFS cannot require Vineyard Wind 1 to be a part of such monitoring networks until such a network of monitoring devices is formalized. However, NMFS will consider implementing such measures in the future should such a network be developed.

Comment 16: The ENGOs stated that it is their general view that NMFS must require a minimum of four PSOs following a two-on, two-off rotation, each responsible for scanning no more than 180° of the horizon. However, the ENGOs further stated that they strongly support Vineyard Wind 1's proposal to use PAM during nighttime HRG surveys, and recognize that in this case, a requirement to employ two PSOs during all nighttime survey operations is impracticable, given the limited availability of berths on the survey vessels and additional personnel required to conduct PAM. The ENGOs state that making this PSO requirement clear to IHA applicants will allow any logistical considerations to be addressed early in the survey planning process. In a related comment, Oceana recommended that all vessels associated with the proposed Vineyard Wind 1 site characterization should be required to carry and use PSOs at all times when underway. The ENGOs and Oceana recommend that NMFS require the use of infrared equipment during periods of darkness and during daylight hours to help maximize probability of detection of marine mammals.

Response: NMFS typically requires that a single PSO must be stationed at the highest vantage point and engaged in general 360-degree scanning during daylight hours. Although NMFS acknowledges that the single PSO cannot reasonably maintain observation of the entire 360-degree area around the vessel, it is reasonable to assume that the single PSO engaged in continual scanning of such a small area (*i.e.*, 500-m EZ,

which is greater than the maximum 178-m harassment zone) will be successful in detecting marine mammals that are available for detection at the surface. Further, as noted by the commenters, and in the notice of the proposed IHA (86 FR 30266; June 7, 2021), a requirement to employ at least two PSOs during all nighttime survey operations is impracticable, given the limited available berths on the survey vessels and the additional personnel Vineyard Wind has conducting PAM. (As noted below, Vineyard Wind 1 plans to conduct PAM, though it is not required by this IHA given NMFS concerns with efficacy, as described in NMFS' response to the following comment). NMFS makes a concerted effort to communicate mitigation and monitoring requirements to applicants as early in the application process as possible. NMFS has analyzed the potential for incidental take resulting from Vineyard Wind 1's activity and has determined that based on the nature of the activities, and in consideration of the mitigation measures included in the IHA, the potential for incidental take when HRG survey equipment is not operational is so low as to be discountable.

The monitoring reports submitted to NMFS have demonstrated that PSOs active only during daylight operations are able to detect marine mammals and implement appropriate mitigation measures. Nevertheless, as night vision technology has continued to improve, NMFS has adapted its practice. NMFS has included a requirement in the proposed IHA and this final IHA that night-vision equipment (*i.e.*, night-vision goggles and/or infrared technology) must be available for use during nighttime monitoring. Under the issued IHA, survey operators are not required to provide PSOs with infrared devices during the day but observers are not prohibited from employing them. Given that use of infrared devices for detecting marine mammals during the day has been shown to be helpful under certain conditions, NMFS will consider requiring them to be made accessible for daytime PSOs in the future as more information becomes available regarding this technology. NMFS is also requiring that all PSOs be equipped with

binoculars and have the ability to estimate distances to marine mammals located in proximity to the vessel and/or EZs. We have determined that the PSO requirements in the IHA are sufficient to ensure the least practicable adverse impact on the affected species or stocks and their habitat.

Comment 17: The ENGOs noted that the proposed IHA does not require monitoring of a “buffer zone” or “monitoring zone” that were required by NMFS in the recent proposed Renewal IHA for Vineyard Wind (86 FR 30435; June 8, 2021). The commenters state that NMFS should explain why the requirements are inconsistent and less stringent monitoring is required in the Vineyard Wind 1 proposed IHA.

Response: This IHA does not explicitly state a specific “buffer zone” or “monitoring zone” that PSOs must monitor, as included in some previous IHAs such as the proposed Renewal IHA mentioned by the commenter (86 FR 30435; June 8, 2021). As stated previously in this notice, NMFS considers impacts from these types of survey operations to be near *de minimis*, and therefore, use of a buffer zone is unnecessary. Further, NMFS did not include this requirement in the IHA so as not to suggest that PSOs should limit their observations to just a specific “buffer” or “monitoring” zone. Rather, NMFS expects PSOs to report all marine mammal observations to the farthest extent that they are able to observe. Therefore, not including a specific “buffer” or “monitoring” zone does not result in less stringent monitoring requirements.

Comment 18: Oceana stated that the IHA must include a requirement for all phases of the Vineyard Wind 1 site characterization to subscribe to the highest level of transparency, including frequent reporting to federal agencies, requirements to report all visual and acoustic detections of North Atlantic right whales and any dead, injured, or entangled marine mammals to NMFS or the Coast Guard as soon as possible and no later than the end of the PSO shift. Oceana states that to foster stakeholder relationships and

allow public engagement and oversight of the permitting, the IHA should require all reports and data to be accessible on a publicly available website.

Response: NMFS agrees with the need for reporting and indeed, the MMPA calls for IHAs to incorporate reporting requirements. As included in the proposed IHA, the final IHA includes requirements for reporting that supports Oceana's recommendations. Vineyard Wind 1 is required to submit a monitoring report to NMFS within 90 days after completion of survey activities that fully documents the methods and monitoring protocols, summarizes the data recorded during monitoring, and describes, assesses and compares the effectiveness of monitoring and mitigation measures. PSO datasheets or raw sightings data must also be provided with the draft and final monitoring report. Further the draft IHA and final IHA stipulate that if a North Atlantic right whale is observed at any time by any project vessels, during surveys or during vessel transit, Vineyard Wind 1 must immediately report sighting information to the NMFS North Atlantic Right Whale Sighting Advisory System and to the U.S. Coast Guard, and that any discoveries of injured or dead marine mammals be reported by Vineyard Wind 1 to the Office of Protected Resources, NMFS, and to the New England/Mid-Atlantic Regional Stranding Coordinator as soon as feasible. All reports and associated data submitted to NMFS are included on the project website for public inspection.

Comment 19: The ENGOs raised concerns regarding the ability of PSOs to effectively detect marine mammals, and state that PSOs alone are certain to underestimate the total number of large whales in the mitigation area based on sea state, and state that visual monitoring alone is insufficient. They state that the concern NMFS raises regarding PAM that relates to the masking that would occur from vessel noise and flow noise are entirely surmountable. They state that the passive acoustic protocol can and should be designed so the hydrophone is not masked by vessel or survey noise and NMFS should make this explicit in the Final IHA for Vineyard Wind 1. They further

state that NMFS should require PAM at all times to maximize the probability of detection for North Atlantic right whales and, ideally, other endangered and protected species and stocks, including during periods of fog, precipitation, and high sea states, when PSOs and infrared technologies are less effective. It should be noted that PAM without visual observers would also be insufficient as individuals may not continually vocalize. Further, the ENGOs and Oceana recommended that a combination of visual monitoring by PSOs and PAM should be used at all times that survey work is underway in order to monitor exclusion zones and maximize the detection of protected species and stocks.

Response: The foremost concern expressed by the ENGOs in making the recommendation to require use of PAM is with regard to North Atlantic right whales. However, the commenters do not explain why they expect that PAM would be effective in detecting vocalizing mysticetes. It is generally well-accepted fact that, even in the absence of additional acoustic sources, using a towed passive acoustic sensor to detect baleen whales (including right whales) is not typically effective because the noise from the vessel, the flow noise, and the cable noise are in the same frequency band and will mask the vast majority of baleen whale calls. Vessels produce low-frequency noise, primarily through propeller cavitation, with main energy in the 5-300 Hertz (Hz) frequency range. Source levels range from about 140 to 195 decibel (dB) re 1 μ Pa (micropascal) at 1 m (NRC, 2003; Hildebrand, 2009), depending on factors such as ship type, load, and speed, and ship hull and propeller design. Studies of vessel noise show that it appears to increase background noise levels in the 71-224 Hz range by 10-13 dB (Hatch *et al.*, 2012; McKenna *et al.*, 2012; Rolland *et al.*, 2012). PAM systems employ hydrophones towed in streamer cables approximately 500 m behind a vessel. Noise from water flow around the cables and from strumming of the cables themselves is also low-frequency and typically masks signals in the same range. Experienced PAM operators participating in a recent workshop (Thode *et al.*, 2017) emphasized that a PAM operation

could easily report no acoustic encounters, depending on species present, simply because background noise levels rendered any acoustic detection impossible. The same workshop report stated that a typical eight-element array towed 500 m behind a vessel could be expected to detect delphinids, sperm whales, and beaked whales at the required range, but not baleen whales, due to expected background noise levels (including seismic noise, vessel noise, and flow noise). At present, NMFS is unaware of PAM design options that would avoid the masking issues described here and in the notice of the proposed IHA (86 FR 30266; June 7, 2021), and despite the commenters' claim that these issues are "entirely surmountable," no recommendations are provided in this regard.

There are several additional reasons why we do not agree that use of PAM is warranted for 24-hour HRG surveys. While NMFS agrees that PAM can be an important tool for augmenting detection capabilities in certain circumstances, its utility in further reducing impact during HRG survey activities is limited. First, for this activity, the area expected to be ensonified above the Level B harassment threshold is relatively small (a maximum of 178 m)—this reflects the fact that, to start with, the source level is comparatively low and the intensity of any resulting impacts would be lower level and, further, it means that inasmuch as PAM will only detect a portion of any animals exposed within a zone, the overall probability of PAM detecting an animal in the harassment zone is low—together these factors support the limited value of PAM for use in reducing take with smaller zones. PAM is only capable of detecting animals that are actively vocalizing, while many marine mammal species vocalize infrequently or during certain activities, which means that only a subset of the animals within the range of the PAM would be detected (and potentially have reduced impacts). Additionally, localization and range detection can be challenging under certain scenarios. For example, odontocetes are fast moving and often travel in large or dispersed groups which makes localization difficult.

Given that the effects to marine mammals from the types of surveys authorized in this IHA are expected to be limited to low level behavioral harassment even in the absence of mitigation, the limited additional benefit anticipated by adding this detection method (especially for right whales and other low frequency cetaceans, species for which PAM has minimal efficacy – NMFS is unaware of any occasions on which a vocalizing mysticete (other than the occasional humpback whale, a species that often vocalizes at relatively high frequencies) has been detected through use of towed PAM), and the cost and impracticability of implementing a full-time PAM program, we have determined the current requirements for visual monitoring are sufficient to ensure the least practicable adverse impact on the affected species or stocks and their habitat. However, we note that Vineyard Wind 1 has stated their intention to voluntarily implement PAM during night operations as an added precautionary measure even though this is not a NMFS requirement due to its expected lack of efficacy.

Comment 20: The ENGOs and Oceana both expressed concerns that the proposed IHA sets no requirement to minimize the impacts of underwater noise through the use of best available technology and other methods to minimize sound levels from geophysical surveys. The ENGOs recommended that NMFS should require Vineyard Wind 1 to select sub-bottom profiling systems, and operate those systems at power settings that achieve the lowest practicable source level for the objective. Oceana recommended that to be consistent with the requirement to achieve “the least practicable impact on such species or stock and its habitat,” the IHA must include conditions for the survey activities that will first avoid adverse effects on North Atlantic right whales in and around the survey site and then minimize and mitigate the effects that cannot be avoided. They state that this should include a full assessment of which activities, technologies and strategies are truly necessary to provide information to inform development of Vineyard Wind 1 and which are not critical. If, for example, a lower impact technique or technology will

provide necessary information about the site without adverse effects, Oceana recommended that technique or technology should be permitted while other tools with more frequent, intense or long-lasting effects should be prohibited. In general, the ENGOs and Oceana asserted that NMFS must require that all IHA applicants minimize the impacts of underwater noise to the fullest extent feasible, including through the use of best available technology and methods to minimize sound levels from geophysical surveys.

Response: The MMPA requires that an IHA include measures that will effect the least practicable adverse impact on the affected species and stock and, in practice, NMFS agrees that the IHA should include conditions for the survey activities that will first avoid adverse effects on North Atlantic right whales in and around the survey site, where practicable, and then minimize the effects that cannot be avoided. NMFS has determined that the IHA meets this requirement to effect the least practicable adverse impact. Oceana does not make any specific recommendations of measures to add to the IHA other than assessing which technologies and strategies are truly necessary to provide information to inform development of Vineyard Wind 1. While the ENGOs recommend the use of sub-bottom profiling systems, the Vineyard Wind 1 developers selected the equipment necessary during HRG surveys to achieve their objectives (which includes shallow sub-bottom profilers). As part of the analysis for all marine site characterization survey IHAs, NMFS evaluated the effects expected as a result of use of the specified activity (*i.e.*, the equipment described here), made the necessary findings, and prescribed mitigation requirements sufficient to achieve the least practicable adverse impact on the affected species and stocks of marine mammals. It is not within NMFS' purview to make judgments regarding what constitutes the "lowest practicable source level" for an operator's survey objectives or the appropriate techniques or technologies for an operator's survey objectives.

Comment 21: The ENGOs and Oceana both generally recommended that NMFS restrict all vessels of all sizes associated with the proposed survey activities to speeds less than 10 kn at all times due to the risk of vessel strikes to North Atlantic right whales and other large whales. The ENGOs note that an exception may be made in limited circumstances where the best available scientific information demonstrates that whales do not use the area at any time. The ENGOs also asserted that NMFS must acknowledge that vessel strikes can result in take by Level A harassment, and that NMFS must explicitly analyze the potential for such take resulting from vessel collisions in its take analysis for Vineyard Wind 1.

Response: While NMFS acknowledges that vessel strikes can result in injury or mortality, we have analyzed the potential for ship strike resulting from Vineyard Wind 1's activity and have determined that based on the nature of the activity and the required mitigation measures specific to vessel strike avoidance included in the IHA, potential for vessel strike is so low as to be discountable. These mitigation measures, most of which were included in the proposed IHA and all of which are required in the final IHA, include: a requirement that all vessel operators comply with 10 kn (18.5 km/hour) or less speed restrictions in any SMA, DMA or Slow Zone (Slow Zones added since publication of the proposed IHA) while underway, and check daily for information regarding the establishment of mandatory or voluntary vessel strike avoidance areas (SMAs, DMAs, Slow Zones) and information regarding North Atlantic right whale sighting locations; a requirement that all vessels greater than or equal to 19.8 m in overall length operating from November 1 through April 30 operate at speeds of 10 kn (18.5 km/hour) or less, except while transiting in Nantucket Sound; a requirement that all vessel operators reduce vessel speed to 10 kn (18.5 km/hour) or less when any large whale, any mother/calf pairs, pods, or large assemblages of non-delphinid cetaceans are observed within 100 m of an underway vessel; a requirement that all survey vessels maintain a separation distance of

500-m or greater from any ESA-listed whales or other unidentified large marine mammals visible at the surface while underway; a requirement that, if underway, vessels must steer a course away from any sighted ESA-listed whale at 10 kn or less until the 500-m minimum separation distance has been established; a requirement that, if an ESA-listed whale is sighted in a vessel's path, or within 500 m of an underway vessel, the underway vessel must reduce speed and shift the engine to neutral; a requirement that all vessels underway must maintain a minimum separation distance of 100 m from all non-ESA-listed baleen whales; and a requirement that all vessels underway must, to the maximum extent practicable, attempt to maintain a minimum separation distance of 50 m from all other marine mammals, with an understanding that at times this may not be possible (*e.g.*, for animals that approach the vessel). We have determined that the ship strike avoidance measures in the IHA are sufficient to ensure the least practicable adverse impact on species or stocks and their habitat. Furthermore, no documented vessel strikes have occurred for any marine site characterization surveys which were issued IHAs from NMFS during the survey activities themselves or while transiting to and from project sites.

Comment 22: Oceana recommended that the IHA should require all vessels supporting site characterization to be equipped with and using Class A Automatic Identification System (AIS) devices at all times while on the water in order to support oversight and enforcement of the conditions of the HRG survey. Oceana suggested this requirement should apply to all vessels, regardless of size, associated with the project.

Response: NMFS is generally supportive of the idea that vessels involved with survey activities be equipped with and using Class A Automatic Identification System (devices) at all times while on the water. Indeed, there is a precedent for NMFS requiring such a stipulation for geophysical surveys in the Atlantic Ocean (38 FR 63268, December 7, 2018); however, these activities carried the potential for much more significant impacts

than the marine site characterization surveys to be carried out by Vineyard Wind 1, with the potential for both Level A and Level B harassment take. Given the small isopleths and small numbers of take authorized by this IHA, NMFS does not agree that the benefits of requiring AIS on all vessels associated with the survey activities outweighs and warrants the cost and practicability issues associated with this requirement.

Comment 23: Oceana asserts that the IHA must include requirements to hold all vessels associated with site characterization surveys accountable to the IHA requirements, including vessels owned by the developer, contractors, employees, and others regardless of ownership, operator, contract. They state that exceptions and exemptions will create enforcement uncertainty and incentives to evade regulations through reclassification and redesignation. They recommend that NMFS simplify this by requiring all vessels to abide by the same requirements, regardless of size, ownership, function, contract or other specifics.

Response: NMFS agrees with Oceana and required these measures in the proposed IHA and final IHA. The IHA requires that a copy of the IHA must be in the possession of Vineyard Wind 1, the vessel operators, the lead PSO, and any other relevant designees of Vineyard Wind 1 operating under the authority of this IHA. The IHA also states that Vineyard Wind 1 must ensure that the vessel operator and other relevant vessel personnel, including the PSO team, are briefed on all responsibilities, communication procedures, marine mammal monitoring protocols, operational procedures, and IHA requirements prior to the start of survey activity, and when relevant new personnel join the survey operations. Further, the IHA includes a measure that states that the IHA may be modified, suspended or withdrawn if the holder fails to abide by the conditions prescribed in the IHA, or if NMFS determines the authorized taking is having more than a negligible impact on the species or stock of affected marine mammals.

Comment 24: The ENGOs objected to NMFS' process to consider extending any one-year IHA with a truncated 15-day comment period as contrary to the MMPA.

Response: NMFS' IHA renewal process meets all statutory requirements. In prior responses to comments about IHA Renewals (*e.g.*, 84 FR 52464; October 02, 2019 and 85 FR 53342, August 28, 2020), NMFS has explained how the renewal process, as implemented, is consistent with the statutory requirements contained in section 101(a)(5)(D) of the MMPA, provides additional efficiencies beyond the use of abbreviated notices, and, further, promotes NMFS' goals of improving conservation of marine mammals and increasing efficiency in the MMPA compliance process. Therefore, we intend to continue implementing the renewal process.

The notice of the proposed IHA published in the **Federal Register** on June 7, 2021 (86 FR 30266) made clear that the agency was seeking comment on the proposed IHA and the potential issuance of a renewal for this project. Because any renewal is limited to another year of identical or nearly identical activities in the same location or the same activities that were not completed within the 1-year period of the initial IHA, reviewers have the information needed to effectively comment on both the immediate proposed IHA and a possible 1-year renewal, should the IHA holder choose to request one in the coming months.

While there would be additional documents submitted with a renewal request, for a qualifying renewal these would be limited to documentation that NMFS would make available and use to verify that the activities are identical to those in the initial IHA, are nearly identical such that the changes would have either no effect on impacts to marine mammals or decrease those impacts, or are a subset of activities already analyzed and authorized but not completed under the initial IHA. NMFS would also need to confirm, among other things, that the activities would occur in the same location; involve the same species and stocks; provide for continuation of the same mitigation, monitoring, and

reporting requirements; and that no new information has been received that would alter the prior analysis. The renewal request would also contain a preliminary monitoring report, in order to verify that effects from the activities do not indicate impacts of a scale or nature not previously analyzed. The additional 15-day public comment period provides the public an opportunity to review these few documents, provide any additional pertinent information and comment on whether they think the criteria for a renewal have been met. Between the initial 30-day comment period on these same activities and the additional 15 days, the total comment period for a renewal is 45 days.

Changes from the Proposed IHA to Final IHA

The final IHA includes a measure requiring Vineyard Wind 1 to abide by the relevant Project Design Criteria (PDC) of the programmatic consultation, completed by NMFS GARFO on June 29, 2021, pursuant to section 7 of the Endangered Species Act. The full list of PDC and BMPs are included in Appendix B of the 2021 Programmatic Consultation, which can be accessed on NMFS' website (<https://www.fisheries.noaa.gov/action/incidental-take-authorization-vineyard-wind-1-marine-site-characterization-surveys>). Further, NMFS has modified several measures in the final IHA to align more closely with the PDCs. We provide a summary here, and the changes are also described in the specific applicable sections below (e.g., **Mitigation Measures**). The modifications include an update to the pre-start clearance observation requirement, which now reflects a 500 m radius for all ESA-listed marine mammals, rather than a 500 m radius for North Atlantic right whales only, as was included in the proposed IHA. Additionally, this pre-start clearance observation is now required for 30 minutes, rather than 60 minutes as initially proposed by Vineyard Wind 1 and included in the proposed IHA (86 FR 30266; June 7, 2021). Further, a 30 minute delay in initiation of acoustic sources is now required after a sighting of all marine mammals other than odontocetes and seals within the pre-start clearance zones, rather than a separate 60-

minute delay for a sighting of North Atlantic right whales, as was initially proposed by Vineyard Wind 1 and included in the proposed IHA. A 30-minute pre-start clearance zone and 30-minute delay for sightings of North Atlantic right whales is consistent with numerous other HRG survey-related IHAs (*e.g.*, 86 FR 33664, June 25, 2021; 86 FR 38033, July 19, 2021; 86 FR 38296, July 20, 2021), as well as the 2021 programmatic consultation. The final IHA also includes an the additional requirement for Vineyard Wind 1 to follow speed restrictions in “Slow Zones” in addition to SMAs and DMAs included in the proposed IHA. Further, the final IHA requires Vineyard Wind 1 to check daily for information regarding the establishment of mandatory or voluntary vessel strike avoidance areas (SMAs, DMAs, Slow Zones) and information regarding North Atlantic right whale sighting locations, while the proposed IHA required Vineyard Wind 1 to monitor NMFS North Atlantic right whale reporting systems from November 1st through April 30th in order to ensure vessel operators are aware of any newly established DMAs. Lastly, the final IHA requires vessels to maintain a minimum separation distance of 500 m from ESA-listed whales or other unidentifiable large marine mammals visible at the surface, rather than keeping a 500 m distance from North Atlantic right whales only. Vessels must maintain a separation distance of 100 m from all non-ESA listed baleen whales. Additionally, NMFS modified a mitigation measure to state that “Vineyard Wind 1 must not operate more than three concurrent HRG survey vessels concurrently, with HRG survey equipment operating at or below *180 kHz*, from January through April within the lease area or export cable corridor, not including coastal and bay waters,” rather than applying this measure to equipment operating at or below 200 kHz, to align with the June 29, 2021 programmatic consultation also. Consistency among documents is expected to avoid confusion among vessel operators and other relevant personnel (including the PSO team) that may otherwise result.

Last, the final IHA authorizes 10 takes by Level B harassment of North Atlantic right whale, rather than 9 takes included in the proposed IHA, to reflect an updated density estimate. Please see the **Estimated Take** section for additional information.

Description of Marine Mammals in the Area of Specified Activities

Sections 3 and 4 of the application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history, of the potentially affected species. Additional information regarding population trends and threats may be found in NMFS's Stock Assessment Reports (SARs; <https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments>) and more general information about these species (e.g., physical and behavioral descriptions) may be found on NMFS's website (<https://www.fisheries.noaa.gov/find-species>).

Table 2 lists all species or stocks for which take is expected and authorized for this action, and summarizes information related to the population or stock, including regulatory status under the MMPA and ESA and potential biological removal (PBR), where known. For taxonomy, we follow the Committee on Taxonomy (2020). PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (as described in NMFS's SARs). While no mortality is anticipated or authorized here, PBR and annual serious injury and mortality from anthropogenic sources are included here as gross indicators of the status of the species and other threats.

Marine mammal abundance estimates presented in this document represent the total number of individuals that make up a given stock or the total number estimated within a particular study or survey area. NMFS's stock abundance estimates for most species represent the total estimate of individuals within the geographic area, if known,

that comprises that stock. For some species, this geographic area may extend beyond U.S. waters. All managed stocks in this region are assessed in NMFS's U.S. Atlantic and Gulf of Mexico SARs. All values presented in Table 2 are the most recent available at the time of publication and, except for North Atlantic right whale, are available in the 2019 SARs (Hayes *et al.*, 2020) and draft 2020 SARs (available online at: <https://www.fisheries.noaa.gov/national/marine-mammal-protection/draft-marine-mammal-stock-assessment-reports>). The most recent North Atlantic right whale stock abundance estimate is presented in NOAA Technical Memorandum NMFS-NE-269 (Pace 2021).

Table 2 -- Marine Mammals Likely To Occur in the Project Area That May Be Affected by Vineyard Wind 1's Planned Activity

Common name	Scientific name	Stock	ESA/MMP A status; Strategic (Y/N) ¹	Stock abundance (CV, N _{min} , most recent abundance survey) ²	PBR	Annual M/SI ³
Order Cetartiodactyla – Cetacea – Superfamily Mysticeti (baleen whales)						
Family Balaenidae						
North Atlantic right whale ⁴	<i>Eubalaena glacialis</i>	Western North Atlantic	E/D; Y	368 (NA; 356; 2018)	0.8	18.6
Family Balaenopteridae (rorquals)						
Humpback whale	<i>Megaptera novaeangliae</i>	Gulf of Maine	-/-; Y	1,393 (0.15; 1,375; 2016)	22	58
Fin whale	<i>Balaenoptera physalus</i>	Western North Atlantic	E/D; Y	6,802 (0.24; 5,573; 2016)	11	2.35
Sei whale	<i>Balaenoptera borealis</i>	Nova Scotia	E/D; Y	6,292 (1.02; 3,098; 2016)	6.2	1.2
Minke whale	<i>Balaenoptera acutorostrata</i>	Canadian Eastern Coastal	-/-; N	21,968 (0.31; 17,002; 2016)	170	10.6
Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Physeteridae						
Sperm whale	<i>Physeter macrocephalus</i>	North Atlantic	E; Y	4,349 (0.28; 3,451; 2016)	3.9	0
Family Delphinidae						
Long-finned pilot whale	<i>Globicephala melas</i>	Western North Atlantic	-/-; N	39,215 (0.3; 30,627; 2016)	306	21

Bottlenose dolphin	<i>Tursiops spp.</i>	Western North Atlantic Offshore	-/-; N	62,851 (0.213; 51,914; 2016)	519	28
Common dolphin	<i>Delphinus delphis</i>	Western North Atlantic	-/-; N	172,974 (0.21; 145,216; 2016)	1,452	399
Atlantic white-sided dolphin	<i>Lagenorhynchus acutus</i>	Western North Atlantic	-/-; N	92,233 (0.71; 54,433; 2016)	544	26
Risso's dolphin	<i>Grampus griseus</i>	Western North Atlantic	-/-; N	35,493 (0.19; 30,289; 2016)	303	54.3
Family Phocoenidae (porpoises)						
Harbor porpoise	<i>Phocoena phocoena</i>	Gulf of Maine/Bay of Fundy	-/-; N	95,543 (0.31; 74,034; 2016)	851	217
Order Carnivora – Superfamily Pinnipedia						
Family Phocidae (earless seals)						
Gray seal ⁵	<i>Halichoerus grypus</i>	Western North Atlantic	-/-; N	27,131 (0.19; 23,158, 2016)	1,389	4,729
Harbor seal	<i>Phoca vitulina</i>	Western North Atlantic	-/-; N	75,834 (0.15; 66,884, 2012)	2,006	350

1 - Endangered Species Act (ESA) status: Endangered (E), Threatened (T)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.

2- NMFS marine mammal stock assessment reports online at:

<https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments>.

CV is coefficient of variation; Nmin is the minimum estimate of stock abundance. In some cases, CV is not applicable (NA).

3 - These values, found in NMFS's SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (e.g., commercial fisheries, vessel strike).

4- This is the latest stock abundance estimate and Nmin as presented in Pace (2021).

5- NMFS stock abundance estimate (and associated PBR value) applies to U.S. population only. Total stock abundance (including animals in Canada) is approximately 451,431. The annual M/SI value is given for the total stock.

As indicated above, all 14 species (with 14 managed stocks) in Table 2 temporally and spatially co-occur with the activity to the degree that take is reasonably likely to occur. In addition to what is included in Sections 3 and 4 of the application, the SARs, and NMFS's website, further detail informing the baseline for select species (i.e., information regarding current Unusual Mortality Events (UME) and important habitat areas) was provided in the notice of proposed IHA (86 FR 30266; June 7, 2021) and is not repeated here. No new information is available since publication of that notice.

Marine Mammal Hearing

Hearing is the most important sensory modality for marine mammals underwater, and exposure to anthropogenic sound can have deleterious effects. To appropriately assess the potential effects of exposure to sound, it is necessary to understand the frequency ranges marine mammals are able to hear. Current data indicate that not all marine mammal species have equal hearing capabilities (*e.g.*, Richardson *et al.*, 1995; Wartzok and Ketten, 1999; Au and Hastings, 2008). To reflect this, Southall *et al.* (2007) recommended that marine mammals be divided into functional hearing groups based on directly measured or estimated hearing ranges on the basis of available behavioral response data, audiograms derived using auditory evoked potential techniques, anatomical modeling, and other data. Note that no direct measurements of hearing ability have been successfully completed for mysticetes (*i.e.*, low-frequency cetaceans). Subsequently, NMFS (2018) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the approximately 65 decibel (dB) threshold from the normalized composite audiograms, with the exception for lower limits for low-frequency cetaceans where the lower bound was deemed to be biologically implausible and the lower bound from Southall *et al.* (2007) retained. Marine mammal hearing groups and their associated hearing ranges are provided in Table 3.

Table 3 -- Marine Mammal Hearing Groups (NMFS, 2018)

Hearing Group	Generalized Hearing Range*
Low-frequency (LF) cetaceans (baleen whales)	7 Hz to 35 kHz
Mid-frequency (MF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz
High-frequency (HF) cetaceans (true porpoises, <i>Kogia</i> , river dolphins, cephalorhynchid, <i>Lagenorhynchus cruciger</i> & <i>L. australis</i>)	275 Hz to 160 kHz
Phocid pinnipeds (PW) (underwater) (true seals)	50 Hz to 86 kHz
Otariid pinnipeds (OW) (underwater) (sea lions and fur seals)	60 Hz to 39 kHz
* Represents the generalized hearing range for the entire group as a composite (<i>i.e.</i> , all species within the group), where individual species' hearing ranges are typically not as broad. Generalized hearing range chosen based on ~65 dB threshold from normalized composite audiogram, with the exception for lower limits for LF cetaceans (Southall <i>et al.</i> 2007) and PW pinniped (approximation).	

The pinniped functional hearing group was modified from Southall *et al.* (2007) on the basis of data indicating that phocid species have consistently demonstrated an extended frequency range of hearing compared to otariids, especially in the higher frequency range (Hemilä *et al.*, 2006; Kastelein *et al.*, 2009; Reichmuth and Holt, 2013).

For more detail concerning these groups and associated frequency ranges, please see NMFS (2018) for a review of available information. Fourteen marine mammal species (12 cetacean and 2 phocids pinnipeds) have the reasonable potential to co-occur with the planned survey activities. Please refer to Table 2. Of the cetacean species that may be present, five are classified as low-frequency cetaceans (*i.e.*, all mysticete species), six are classified as mid-frequency cetaceans (*i.e.*, all delphinid species and the sperm whale), and one is classified as high-frequency cetaceans (*i.e.*, harbor porpoise).

Potential Effects of Specified Activities on Marine Mammals and their Habitat

The notice of proposed IHA included a summary of the ways that Vineyard Wind 1's specified activity may impact marine mammals and their habitat (86 FR 30266; June 7, 2021). Detailed descriptions of the potential effects of similar specified activities have been provided in other recent **Federal Register** notices, including for survey activities using the same methodology, over a similar amount of time, and occurring within the same specified geographical region (*e.g.*, 82 FR 20563, May 3, 2017; 85 FR 36537, June 17, 2020; 85 FR 37848, June 24, 2020; 85 FR 48179, August 10, 2020). No significant

new information is available, and we refer the reader to the notice of proposed IHA (86 FR 30266; June 7, 2021) and to these documents rather than repeating the details here. The **Estimated Take** section includes a quantitative analysis of the number of individuals that are expected to be taken by Vineyard Wind 1's activity. The **Negligible Impact Analysis and Determination** section considers the potential effects of the specified activity, the **Estimated Take** section, and the **Mitigation Measures** section, to draw conclusions regarding the likely impacts of these activities on the reproductive success or survivorship of individuals and how those impacts on individuals are likely to impact marine mammal species or stocks. The notice of proposed IHA (86 FR 30266; June 7, 2021) also provided background information regarding active acoustic sound sources and acoustic terminology, which is not repeated here.

The potential effects of Vineyard Wind 1's specified survey activity are expected to be limited to Level B behavioral harassment. No permanent or temporary auditory effects, or significant impacts to marine mammal habitat, including prey, are expected.

Estimated Take

This section provides an estimate of the number of incidental takes authorized through this IHA, which will inform both NMFS's consideration of "small numbers" and the negligible impact determination.

Harassment is the only type of take expected to result from these activities. Except with respect to certain activities not pertinent here, section 3(18) of the MMPA defines "harassment" as any act of pursuit, torment, or annoyance, which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

Authorized takes are by Level B harassment only, in the form of disruption of behavioral patterns for individual marine mammals resulting from exposure to HRG sources. Based primarily on the characteristics of the signals produced by the acoustic sources planned for use, Level A harassment is neither anticipated (even absent mitigation) nor authorized. Consideration of the anticipated effectiveness of the mitigation measures (*i.e.*, exclusion zones (EZs) and shutdown measures) discussed in detail below in the **Mitigation Measures** section, further strengthens the conclusion that Level A harassment is not a reasonably anticipated outcome of the survey activity. As described previously, no serious injury or mortality is anticipated or authorized for this activity. Below we describe how the take is estimated.

Generally speaking, we estimate take by considering: (1) acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; (2) the area or volume of water that will be ensonified above these levels in a day; (3) the density or occurrence of marine mammals within these ensonified areas; and, (4) and the number of days of activities. We note that while these basic factors can contribute to a basic calculation to provide an initial prediction of takes, additional information that can qualitatively inform take estimates is also sometimes available (*e.g.*, previous monitoring results or average group size). Below, we describe the factors considered here in more detail and present the take estimates.

Acoustic Thresholds

NMFS recommends the use of acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to incur permanent threshold shift (PTS) of some degree (equated to Level A harassment).

Level B Harassment– Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source (*e.g.*, frequency, predictability, duty cycle), the environment (*e.g.*, bathymetry), and the receiving animals (hearing, motivation, experience, demography, behavioral context) and can be difficult to predict (Southall *et al.*, 2007, Ellison *et al.*, 2012). Based on what the available science indicates and the practical need to use a threshold based on a factor that is both predictable and measurable for most activities, NMFS uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS predicts that marine mammals are likely to be behaviorally harassed in a manner we consider Level B harassment when exposed to underwater anthropogenic noise above received levels of 160 dB re 1 μ Pa (rms) for the impulsive sources (*i.e.*, boomers, sparkers) and non-impulsive, intermittent sources (*e.g.*, chirp SBPs) evaluated here for Vineyard Wind 1's planned activity.

Level A Harassment- NMFS's Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0) (Technical Guidance, 2018) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). For more information, see NMFS's 2018 Technical Guidance, which may be accessed at www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance.

Vineyard Wind 1's planned activity includes the use of impulsive (*i.e.*, sparkers and boomers) and non-impulsive (*e.g.*, CHIRP SBP) sources. However, as discussed above, NMFS has concluded that Level A harassment is not a reasonably likely outcome for marine mammals exposed to noise through use of the sources planned for use here, and the potential for Level A harassment is not evaluated further in this document. Please

see Vineyard Wind 1's application for details of a quantitative exposure analysis exercise, *i.e.*, calculated Level A harassment isopleths and estimated Level A harassment exposures. Maximum estimated Level A harassment isopleths were less than 5 m for all sources and hearing groups with the exception of an estimated 53 m zone calculated for high-frequency cetaceans during use of the Applied Acoustics AA251 Boomer, (see Table 1 for source characteristics). Vineyard Wind 1 did not request authorization of take by Level A harassment, and no take by Level A harassment is authorized by NMFS.

Ensonified Area

NMFS has developed a user-friendly methodology for estimating the extent of the Level B harassment isopleths associated with relevant HRG survey equipment (NMFS, 2020). This methodology incorporates frequency and directionality to refine estimated ensonified zones. For acoustic sources that operate with different beamwidths, the maximum beamwidth was used, and the lowest frequency of the source was used when calculating the frequency-dependent absorption coefficient (Table 1).

NMFS considers the data provided by Crocker and Fratantonio (2016) to represent the best available information on source levels associated with HRG equipment and, therefore, recommends that source levels provided by Crocker and Fratantonio (2016) be incorporated in the method described above to estimate isopleth distances to harassment thresholds. In cases when the source level for a specific type of HRG equipment is not provided in Crocker and Fratantonio (2016), NMFS recommends that either the source levels provided by the manufacturer be used, or, in instances where source levels provided by the manufacturer are unavailable or unreliable, a proxy from Crocker and Fratantonio (2016) be used instead. Table 1 shows the HRG equipment types that may be used during the planned surveys and the source levels associated with those HRG equipment types.

Results of modeling using the methodology described above indicated that, of the HRG survey equipment planned for use by Vineyard Wind 1 that has the potential to result in Level B harassment of marine mammals, the Applied Acoustics AA251 Boomer will produce the largest Level B harassment isopleth (178 m; see Table 7 of Vineyard Wind 1's application). The estimated Level B harassment isopleth associated with the GeoMarine Geo Spark 2000 (400 tip) system planned for use is 141 m. Although Vineyard Wind 1 does not expect to use the AA251 Boomer source on all planned survey days, it proposes to assume, for purposes of analysis, that the boomer will be used on all survey days. This is a conservative approach, as the actual sources used on individual survey days may produce smaller harassment distances.

Marine Mammal Occurrence

In this section we provide the information about the presence, density, or group dynamics of marine mammals that will inform the take calculations.

Density estimates for all species within the project area were derived from habitat-based density modeling results reported by Roberts *et al.* (2016, 2017, 2018, 2020). The data presented by Roberts *et al.* (2016, 2017, 2018, 2020) incorporates aerial and shipboard line-transect survey data from NMFS and other organizations and incorporates data from 8 physiographic and 16 dynamic oceanographic and biological covariates, and controls for the influence of sea state, group size, availability bias, and perception bias on the probability of making a sighting. These density models were originally developed for all cetacean taxa in the U.S. Atlantic (Roberts *et al.*, 2016). In subsequent years, certain models have been updated based on additional data as well as certain methodological improvements. More information is available online at <https://seamap.env.duke.edu/models/Duke/EC/>.

Marine mammal density estimates in the survey area (animals/km²) were obtained using the most recent model results for all taxa (Roberts *et al.*, 2016, 2017, 2018, 2020).

We note the availability of a more recent model version for the North Atlantic right whale. However, this latest update resulted in changed predictions only for Cape Cod Bay and, therefore, would not result in changes to the take estimate presented herein. More information is available online at:

https://seamap.env.duke.edu/models/Duke/EC/EC_North_Atlantic_right_whale_history.html. The updated models incorporate additional sighting data, including sightings from NOAA's Atlantic Marine Assessment Program for Protected Species (AMAPPS) surveys. Roberts *et al.* (2016, 2017, 2018, 2020) provide abundance estimates for species or species guilds within 10 km x 10 km grid cells (100 km²; except North Atlantic right whale- see discussion below) on a monthly or annual basis, depending on the species.

For the exposure analysis, density data from Roberts *et al.* (2016, 2017, 2018, 2020) were mapped using a geographic information system (GIS). Vineyard Wind 1 calculated densities within a 50 km buffer polygon around the wind development area perimeter. The 50 km limit was derived from studies demonstrating that received levels, distance from the source, and behavioral context are known to influence marine mammals' probability of behavioral response (Dunlop *et al.* 2017). The monthly density was determined by calculating the mean of all grid cells partially or fully within the buffer polygon. The average monthly abundance for each species in each survey area was calculated as the mean value of the grid cells within the buffer area in each month and then converted to density (individuals/km²) by dividing by 100 km² (Table 1). Annual mean densities were calculated from monthly densities (Table 4).

The estimated monthly densities of North Atlantic right whales were based on Version 10 model results from Roberts *et al.* (2020) (updated from the Version 9 model results included in the proposed IHA). As stated in the **Comments and Responses** section of this notice, the Version 10 update to the model was primarily focused on Massachusetts Bay, which does not overlap the project area and therefore, is not relevant

to this IHA. However, Version 10 also included additional survey data in the “Hatteras Island to Nantucket Shoals” area (a portion of which does overlap the project area), which resulted in slightly higher densities in part of the project area south of Nantucket. Therefore, the Version 10 density for the project area is 0.0018/km², rather than 0.0016/km² in Version 9. NMFS updated the take estimate for North Atlantic right whale in the final IHA to reflect the Version 10 update. Additionally, as noted above, there has been an additional minor model update affecting predictions for Cape Cod Bay in the month of December, which is not relevant to the location of this survey off of Rhode Island and southern Massachusetts.) These updated data for North Atlantic right whales are provided as densities (individuals/1 km²) within 5 km x 5 km grid cells (25 km²) on a monthly basis. The same GIS process described above was used to select the appropriate grid cells from each month and the monthly North Atlantic right whale density in each survey area was calculated as the mean value of the grid cells as described above. Additional data regarding average group sizes from survey effort in the region was considered to ensure adequate take estimates are evaluated.

Take Calculation and Estimation

Here we describe how the information provided above is brought together to produce a quantitative take estimate. In order to estimate the number of marine mammals predicted to be exposed to sound levels that would result in harassment, radial distances to predicted isopleths corresponding to harassment thresholds are calculated, as described above. Those distances are then used to calculate the area(s) around the HRG survey equipment predicted to be ensonified to sound levels that exceed harassment thresholds. The area estimated to be ensonified to relevant thresholds in a single day (zone of influence (ZOI)) is then calculated, based on areas predicted to be ensonified around the HRG survey equipment (*i.e.*, 178 m) and the estimated trackline distance traveled per day by the survey vessel (*i.e.*, 80 km). Based on the maximum estimated distance to the Level

B harassment threshold of 178 m (Applied Acoustics AA251 Boomer) and the maximum estimated daily track line distance of 80 km, the ZOI is estimated to be 28.58 km² during Vineyard Wind 1's planned HRG surveys. As described above, this is a conservative estimate as it assumes the HRG source that results in the greatest distance to the Level B harassment isopleth will be operated at all times during all vessel days.

$$ZOI = (\text{Distance/day} \times 2r) + \pi r^2$$

Where r is the linear distance from the source to the harassment isopleth.

Potential daily Level B harassment takes are estimated by multiplying the average annual marine mammal densities (animals/km²), as described above, by the ZOI.

Estimated numbers of each species taken over the duration of the authorization are calculated by multiplying the potential daily Level B harassment takes by the total number of vessel days plus a 10 percent buffer (*i.e.*, by 170 vessel days x 1.1 percent = 192.5 vessel days). The product is then rounded, to generate an estimate of the total number of instances of harassment expected for each species over the duration of the survey. A summary of this method is illustrated in the following formula:

$$\text{Estimated Take} = D \times ZOI \times \text{vessel days}$$

Where D = average species density (animals/km²), ZOI = maximum daily ensonified area to relevant threshold, and vessel days = 192.5.

Take by Level B harassment authorized is shown in Table 4.

Table 4 -- Total Numbers of Incidental Take of Marine Mammals Authorized and Authorized Takes as a Percentage of Population

Species of interest	Annual mean density (km ²)	Estimated Takes by Level B Harassment	Authorized Takes by Level B Harassment ^a	Abundance	Percent of Stock
Fin whale	0.00149	8.22	8	6,802	0.13
Humpback whale	0.00084	4.63	5	1,393	0.36
Minke whale	0.00062	3.42	3	21,968	0.02
North Atlantic right whale ^b	0.0018	9.9	10	368	2.72
Sei whale	0.00005	0.28	2	6,292	0.03

Sperm whale	0.00006	0.33	2	4,349	0.05
Atlantic white sided dolphin	0.02226	122.78	123	92,233	0.13
Bottlenose dolphin	0.0403	222.29	222	62,851	0.35
Long-finned pilot whale	0.00459	25.32	25	39,215	0.07
Risso's dolphin	0.00012	0.66	8	35,493	0.02
Common dolphin	0.0544	300.06	3,484	172,974	2.01
Harbor porpoise	0.02858	157.64	158	95,543	0.17
Gray seal ^c	0.09784	539.67	540	27,131	1.99
Harbor seal ^c		539.67	540	75,834	0.71

^a Increases from calculated values for sei whale, sperm whale, and Risso's dolphin are based on observed group sizes during Vineyard Wind LLC's 2018-2020 surveys (Vineyard Wind 2018, 2020a, 2020b).

^b Updated to reflect the Roberts *et al.* (2020) Version 10 density estimate.

^c Roberts *et al.* (2018) only provides density estimates for seals without differentiating by species. Harbor seals and gray seals are assumed to occur equally; therefore, density values were split evenly between the two species, *i.e.*, total estimated take for "seals" is 1,080.

The take numbers shown in Table 4 are those requested by Vineyard Wind 1, with the exception of certain minor rounding differences. Further, Vineyard Wind 1 requested take of the pilot whale guild, rather than just long-finned pilot whale, but as described previously, pilot whales in the project area are expected to be long-finned pilot whales. Additionally, NMFS increased authorized Level B harassment take of common dolphin to 3,484 takes. This take estimate reflects the daily rate of approximately 18.1 common dolphin observations within the Level B harassment zone per vessel day (3,332 dolphin observations over 184 days) during surveys under Vineyard Wind's previous IHA (85 FR 42357; July 14, 2020), and an estimated 192.5 vessel days, as described above (18.1 takes per day x 192.5 vessel days= 3,484 takes). Given the overlap in project areas, NMFS expects that this estimate is more appropriate than the density-based common dolphin take estimate calculated by Vineyard Wind 1. For all other species, NMFS concurs with the take numbers requested by Vineyard Wind 1 and proposes to authorize them.

Mitigation Measures

In order to issue an IHA under section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to the activity, and other means of

effecting the least practicable impact on the species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stock for taking for certain subsistence uses (latter not applicable for this action). NMFS regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting the activity or other means of effecting the least practicable adverse impact upon the affected species or stocks and their habitat (50 CFR 216.104(a)(11)).

In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, we carefully consider two primary factors:

(1) The manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat. This considers the nature of the potential adverse impact being mitigated (likelihood, scope, range). It further considers the likelihood that the measure will be effective if implemented (probability of accomplishing the mitigating result if implemented as planned), the likelihood of effective implementation (probability implemented as planned); and

(2) The practicability of the measures for applicant implementation, which may consider such things as cost and impact on operations.

Mitigation for Marine Mammals and Their Habitat

NMFS requires the following mitigation measures be implemented during Vineyard Wind 1's planned marine site characterization surveys.

Marine Mammal Exclusion Zones and Harassment Zones

Marine mammal EZs will be established around the HRG survey equipment and monitored by protected species observers (PSO):

- 500 m (1,640 ft) EZ for North Atlantic right whales during use of impulsive acoustic sources (*e.g.*, boomers and/or sparkers) and certain non-impulsive acoustic sources (nonparametric sub-bottom profilers); and
- 100 m (328 ft) EZ for all other marine mammals, with certain exceptions specified below, during use of impulsive acoustic sources (*e.g.*, boomers and/or sparkers).

If a marine mammal is detected approaching or entering the EZs during the HRG survey, the vessel operator will adhere to the shutdown procedures described below to minimize noise impacts on the animals. These stated requirements will be included in the training to be provided to the survey team.

Pre-Clearance of the Exclusion Zones

Vineyard Wind 1 will implement a 30-minute pre-clearance period of the pre-clearance zones prior to the initiation of ramp-up of HRG equipment. This pre-clearance duration was proposed by Vineyard Wind 1. During this period, PSO(s) will monitor a 500 m zone for ESA-listed marine mammals (North Atlantic right whale, fin whale, sei whale, sperm whale) and a 100 m zone for non-ESA-listed marine mammals, using the appropriate visual technology. Ramp-up may not be initiated if any marine mammal(s) is within its respective zones. If a marine mammal is observed within the respective zone during the pre-clearance period, ramp-up may not begin until the animal(s) has been observed exiting its respective zone or until an additional time period has elapsed with no further sighting (*i.e.*, 15 minutes for small odontocetes and seals, 30 minutes for all other species).

Ramp-Up of Survey Equipment

When technically feasible, a ramp-up procedure will be used for HRG survey equipment capable of adjusting energy levels at the start or restart of survey activities. The ramp-up procedure will be used at the beginning of HRG survey activities in order to

provide additional protection to marine mammals near the survey area by allowing them to vacate the area prior to the commencement of survey equipment operation at full power.

A ramp-up will begin with the powering up of the smallest acoustic HRG equipment at its lowest practical power output appropriate for the survey. When technically feasible, the power will then be gradually turned up and other acoustic sources will be added.

Ramp-up activities will be delayed if a marine mammal(s) enters its respective EZ. Ramp-up will continue if the animal has been observed exiting its respective EZ or until an additional time period has elapsed with no further sighting (*i.e.*, 15 minutes for small odontocetes and seals, 30 minutes for all other species).

Activation of survey equipment through ramp-up procedures may not occur when visual observation of the pre-clearance/exclusion zone is not expected to be effective using the appropriate visual technology (*i.e.*, during inclement conditions such as heavy rain or fog).

Shutdown Procedures

An immediate shutdown of the HRG survey equipment will be required if a marine mammal is sighted entering or within its respective EZ. The vessel operator must comply immediately with any call for shutdown by the PSO. Any disagreement between the PSO and vessel operator should be discussed only after shutdown has occurred. Subsequent restart of the survey equipment can be initiated if the animal has been observed exiting its respective EZ or until an additional time period has elapsed (*i.e.*, 15 minutes for delphinid cetaceans and seals, 30 minutes for all other species).

If a species for which authorization has not been granted, or, a species for which authorization has been granted but the authorized number of takes have been met,

approaches or is observed within the Level B harassment zone (178 m impulsive), shutdown will occur.

If the acoustic source is shut down for reasons other than mitigation (*e.g.*, mechanical difficulty) for less than 30 minutes, it may be activated again without ramp-up if PSOs have maintained constant observation and no detections of any marine mammal have occurred within the respective EZs. If the acoustic source is shut down for a period longer than 30 minutes and PSOs have maintained constant observation, then pre-clearance and ramp-up procedures will be initiated as described in the previous section.

The shutdown requirement will be waived for small delphinids of the following genera: *Delphinus*, *Lagenorhynchus* (*acutus* only), and *Tursiops*. Specifically, if a delphinid from the specified genera is visually detected approaching the vessel (*i.e.*, to bow ride) or towed equipment, shutdown is not required. Furthermore, if there is uncertainty regarding identification of a marine mammal species (*i.e.*, whether the observed marine mammal(s) belongs to one of the delphinid genera for which shutdown is waived), PSOs must use best professional judgement in making the decision to call for a shutdown. Additionally, shutdown is required if a delphinid detected in the EZ belongs to a genus other than those specified.

Shutdown, pre-start clearance, and ramp-up procedures are not required during HRG survey operations using only non-impulsive sources (*e.g.*, USBL and parametric sub-bottom profilers) other than non-parametric sub-bottom profilers (*e.g.*, CHIRPs). Pre-clearance and ramp-up, but not shutdown, are required when using non-impulsive, non-parametric sub-bottom profilers.

Vessel Strike Avoidance

Vineyard Wind 1 will ensure that vessel operators and crew maintain a vigilant watch for cetaceans and pinnipeds and slow down or stop their vessels to avoid striking

these species. Survey vessel crew members responsible for navigation duties will receive site-specific training on marine mammals sighting/reporting and vessel strike avoidance measures. Vessel strike avoidance measures include the following, except under circumstances when complying with these requirements would put the safety of the vessel or crew at risk:

- Vessel operators and crews must maintain a vigilant watch for all protected species and slow down, stop their vessel, or alter course, as appropriate and regardless of vessel size, to avoid striking any protected species. A visual observer aboard the vessel must monitor a vessel strike avoidance zone based on the appropriate separation distance around the vessel (distances stated below). Visual observers monitoring the vessel strike avoidance zone may be third-party observers (*i.e.*, PSOs) or crew members, but crew members responsible for these duties must be provided sufficient training to (1) distinguish protected species from other phenomena and (2) broadly to identify a marine mammal as a right whale, other whale (defined in this context as sperm whales or baleen whales other than right whales), or other marine mammal;
- All survey vessels, regardless of size, must observe a 10-knot speed restriction in specific areas designated by NMFS for the protection of North Atlantic right whales from vessel strikes including SMAs, DMAs, and Slow Zones when in effect;
- All vessels greater than or equal to 19.8 m in overall length operating from November 1 through April 30 will operate at speeds of 10 knots or less, except while transiting in Nantucket Sound;
- All vessels must reduce their speed to 10 knots or less when mother/calf pairs, pods, or large assemblages of cetaceans are observed near a vessel;
- All vessels must maintain a minimum separation distance of 500 m from ESA-listed whales or other unidentifiable large marine mammals visible at the surface;

- All vessels must maintain a minimum separation distance of 100 m from all non-ESA-listed baleen whales;
- All vessels must, to the maximum extent practicable, attempt to maintain a minimum separation distance of 50 m from all other marine mammals, with an understanding that at times this may not be possible (*e.g.*, for animals that approach the vessel);
- When marine mammals are sighted while a vessel is underway, the vessel shall take action as necessary to avoid violating the relevant separation distance (*e.g.*, attempt to remain parallel to the animal's course, avoid excessive speed or abrupt changes in direction until the animal has left the area). If marine mammals are sighted within the relevant separation distance, the vessel must reduce speed and shift the engine to neutral, not engaging the engines until animals are clear of the area. This does not apply to any vessel towing gear or any vessel that is navigationally constrained;
- These requirements do not apply in any case where compliance would create an imminent and serious threat to a person or vessel or to the extent that a vessel is restricted in its ability to maneuver and, because of the restriction, cannot comply; and
- Members of the monitoring team will consult NMFS North Atlantic right whale reporting system and Whale Alert, as able, for the presence of North Atlantic right whales throughout survey operations, and for the establishment of a DMA or Slow Zone. If NMFS should establish a DMA or Slow Zone in the survey area during survey operations, the vessels will abide by speed restrictions in the DMA or Slow Zone.

Passive Acoustic Monitoring

Vineyard Wind 1 plans to employ trained PAM operators to monitor for acoustic detections of marine mammals during nighttime HRG survey activities. PAM operators will communicate nighttime detections to the lead PSO on duty who will ensure the implementation of the appropriate mitigation measure. If PAM is not used or is deemed

non-functional at any time during the survey, the survey will be shut down until PAM is restored. NMFS does not concur that PAM is an effective technique for detecting mysticetes in order to implement mitigation measures during HRG surveys, given masking that would occur from vessel noise and flow noise. Therefore, NMFS has not included it as a requirement in this IHA.

Seasonal Restrictions

Vineyard Wind 1 will not operate more than three survey vessels concurrently, with HRG survey equipment operating below 180 kHz, from January through April within the lease area or export cable corridor, not including coastal and bay waters. Additionally, the monitoring team will consult NMFS's North Atlantic right whale reporting systems for any observed right whales throughout survey operations within or adjacent to SMAs, DMAs, and/or Slow Zones and will comply with 10 knot speed restrictions in any SMA, DMA, or Slow Zone as noted above.

Crew Training

Prior to initiation of survey work, all crew members will undergo environmental training, a component of which will focus on the procedures for sighting and protection of marine mammals.

In addition to the measures discussed in detail in this section, Vineyard Wind 1 must abide by the relevant Project Design Criteria (PDC) of the programmatic consultation completed by NMFS GARFO on June 29, 2021, pursuant to section 7 of the Endangered Species Act.

Based on our evaluation of the applicant's planned measures, NMFS has determined that the mitigation measures provide the means effecting the least practicable impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Monitoring and Reporting

In order to issue an IHA for an activity, section 101(a)(5)(D) of the MMPA states that NMFS must set forth requirements pertaining to the monitoring and reporting of such taking. The MMPA implementing regulations at 50 CFR 216.104 (a)(13) indicate that requests for authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the planned action area. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.

Monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:

- Occurrence of marine mammal species or stocks in the area in which take is anticipated (*e.g.*, presence, abundance, distribution, density).
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) action or environment (*e.g.*, source characterization, propagation, ambient noise); (2) affected species (*e.g.*, life history, dive patterns); (3) co-occurrence of marine mammal species with the action; or (4) biological or behavioral context of exposure (*e.g.*, age, calving or feeding areas).
- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors.
- How anticipated responses to stressors impact either: (1) long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks.
- Effects on marine mammal habitat (*e.g.*, marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat).
- Mitigation and monitoring effectiveness.

Monitoring Measures

As described above, visual monitoring will be performed by qualified and NMFS-approved PSOs, the resumes of whom will be provided to NMFS for review and approval prior to the start of survey activities. Vineyard Wind 1 will employ independent, dedicated, trained PSOs, meaning that the PSOs must (1) be employed by a third-party observer provider, (2) have no tasks other than to conduct observational effort, collect data, and communicate with and instruct relevant vessel crew with regard to the presence of marine mammals and mitigation requirements (including brief alerts regarding maritime hazards), and (3) have successfully completed an approved PSO training course appropriate for their designated task.

The PSOs will be responsible for monitoring the waters surrounding each survey vessel to the farthest extent permitted by sighting conditions, including exclusion zones, during all HRG survey operations. PSOs will visually monitor and identify marine mammals, including those approaching or entering the established exclusion zones during survey activities. It will be the responsibility of the Lead PSO on duty to communicate the presence of marine mammals as well as to communicate the action(s) that are necessary to ensure mitigation and monitoring requirements are implemented as appropriate.

During all HRG survey operations (*e.g.*, any day on which use of an HRG source is planned to occur), a minimum of one PSO must be on duty and conducting visual observations at all times on all active survey vessels when HRG equipment operating at or below 200 kHz is operating, including both daytime and nighttime operations. Visual monitoring will begin no less than 30 minutes prior to initiation of HRG survey equipment and will continue until 30 minutes after use of the acoustic source ceases. Vineyard Wind 1 states that a requirement to employ at least two PSOs during all

nighttime survey operations is impracticable, given the limited available berths on the survey vessels and additional personnel required to conduct PAM.

Observations will take place from the highest available vantage point on the survey vessel. In cases where more than one PSO is on duty at a time PSOs will coordinate to ensure 360° visual coverage around the vessel from the most appropriate observation posts. PSOs may be on watch for a maximum of 4 consecutive hours followed by a break of at least 2 hours between watches and may conduct a maximum of 12 hours of observation per 24-hour period. In cases where multiple vessels are surveying concurrently, any observations of marine mammals will be communicated to PSOs on all survey vessels.

PSOs must be equipped with binoculars and have the ability to estimate distance and bearing to detect marine mammals, particularly in proximity to exclusion zones. Reticulated binoculars will also be available to PSOs for use as appropriate based on conditions and visibility to support the monitoring of marine mammals. PSOs must use night-vision technology during nighttime surveys when the sources are active. Position data will be recorded using hand-held or vessel GPS units for each sighting.

During good conditions (*e.g.*, daylight hours; Beaufort sea state (BSS) 3 or less), to the maximum extent practicable, PSOs will conduct observations when the acoustic source is not operating for comparison of sighting rates and behavior with and without use of the acoustic source. Any observations of marine mammals by crew members aboard any vessel associated with the survey will be relayed to the PSO team. Data on all PSO observations will be recorded based on standard PSO collection requirements. This will include dates, times, and locations of survey operations; dates and times of observations, location and weather; details of marine mammal sightings (*e.g.*, species, numbers, behavior); and details of any observed marine mammal take that occurs (*e.g.*, noted behavioral disturbances).

Reporting Measures

Within 90 days after completion of survey activities, a final technical report will be provided to NMFS that fully documents the methods and monitoring protocols, summarizes the data recorded during monitoring, summarizes the number of marine mammals estimated to have been taken during survey activities (by species, when known), summarizes the mitigation actions taken during surveys (including what type of mitigation and the species and number of animals that prompted the mitigation action, when known), and provides an interpretation of the results and effectiveness of all mitigation and monitoring measures. Any recommendations made by NMFS must be addressed in the final report prior to acceptance by NMFS. PSO datasheets or raw sightings data must also be provided with the draft and final monitoring report. All draft and final monitoring reports must be submitted to *PR.ITP.MonitoringReports@noaa.gov* and *ITP.Davis@noaa.gov*.

The report must contain at minimum, the following:

- PSO names and affiliations;
- Dates of departures and returns to port with port name;
- Dates and times (Greenwich Mean Time) of survey effort and times corresponding with PSO effort;
- Vessel location (latitude/longitude) when survey effort begins and ends; vessel location at beginning and end of visual PSO duty shifts;
- Vessel heading and speed at beginning and end of visual PSO duty shifts and upon any line change;
- Environmental conditions while on visual survey (at beginning and end of PSO shift and whenever conditions change significantly), including wind speed and direction, Beaufort sea state, Beaufort wind force, swell height, weather conditions, cloud cover, sun glare, and overall visibility to the horizon;

- Factors that may be contributing to impaired observations during each PSO shift change or as needed as environmental conditions change (*e.g.*, vessel traffic, equipment malfunctions); and

- Survey activity information, such as type of survey equipment in operation, acoustic source power output while in operation, and any other notes of significance (*i.e.*, pre-clearance survey, ramp-up, shutdown, end of operations, *etc.*).

If a marine mammal is sighted, the following information should be recorded:

- Watch status (sighting made by PSO on/off effort, opportunistic, crew, alternate vessel/platform);
- PSO who sighted the animal;
- Time of sighting;
- Vessel location at time of sighting;
- Water depth;
- Direction of vessel's travel (compass direction);
- Direction of animal's travel relative to the vessel;
- Pace of the animal;
- Estimated distance to the animal and its heading relative to vessel at initial sighting;
- Identification of the animal (*e.g.*, genus/species, lowest possible taxonomic level, or unidentified); also note the composition of the group if there is a mix of species;
- Estimated number of animals (high/low/best);
- Estimated number of animals by cohort (adults, yearlings, juveniles, calves, group composition, *etc.*);

- Description (as many distinguishing features as possible of each individual seen, including length, shape, color, pattern, scars or markings, shape and size of dorsal fin, shape of head, and blow characteristics);
- Detailed behavior observations (*e.g.*, number of blows, number of surfaces, breaching, spyhopping, diving, feeding, traveling; as explicit and detailed as possible; note any observed changes in behavior);
- Animal's closest point of approach and/or closest distance from the center point of the acoustic source; and
- Description of any actions implemented in response to the sighting (*e.g.*, delays, shutdown, ramp-up, speed or course alteration, etc.) and time and location of the action.

If a North Atlantic right whale is observed at any time by PSOs or personnel on any project vessels, during surveys or during vessel transit, Vineyard Wind 1 must immediately report sighting information to the NMFS North Atlantic Right Whale Sighting Advisory System: (866) 755-6622. North Atlantic right whale sightings in any location may also be reported to the U.S. Coast Guard via channel 16.

In the event that personnel involved in the survey activities covered by the authorization discover an injured or dead marine mammal, Vineyard Wind 1 must report the incident to the NMFS Office of Protected Resources (OPR) and the NMFS New England/Mid-Atlantic Stranding Coordinator as soon as feasible. The report must include the following information:

- Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);
- Species identification (if known) or description of the animal(s) involved;
- Condition of the animal(s) (including carcass condition if the animal is dead);

- Observed behaviors of the animal(s), if alive;
- If available, photographs or video footage of the animal(s); and
- General circumstances under which the animal was discovered.

In the event of a vessel strike of a marine mammal by any vessel involved in the activities covered by the authorization, Vineyard Wind 1 must report the incident to the NMFS OPR and the NMFS New England/Mid-Atlantic Stranding Coordinator as soon as feasible. The report must include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Species identification (if known) or description of the animal(s) involved;
- Vessel's speed during and leading up to the incident;
- Vessel's course/heading and what operations were being conducted (if applicable);
- Status of all sound sources in use;
- Description of avoidance measures/requirements that were in place at the time of the strike and what additional measures were taken, if any, to avoid strike;
- Environmental conditions (*e.g.*, wind speed and direction, Beaufort sea state, cloud cover, visibility) immediately preceding the strike;
- Estimated size and length of animal that was struck;
- Description of the behavior of the marine mammal immediately preceding and following the strike;
- If available, description of the presence and behavior of any other marine mammals immediately preceding the strike;
- Estimated fate of the animal (*e.g.*, dead, injured but alive, injured and moving, blood or tissue observed in the water, status unknown, disappeared); and
- To the extent practicable, photographs or video footage of the animal(s).

Negligible Impact Analysis and Determination

NMFS has defined negligible impact as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.*, population-level effects). An estimate of the number of takes alone is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be “taken” through harassment, NMFS considers other factors, such as the likely nature of any responses (*e.g.*, intensity, duration), the context of any responses (*e.g.*, critical reproductive time or location, migration), as well as effects on habitat, and the likely effectiveness of the mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS’s implementing regulations (54 FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into this analysis via their impacts on the environmental baseline (*e.g.*, as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels).

To avoid repetition, our analysis applies to all the species listed in Table 2, given that NMFS expects the anticipated effects of the planned survey to be similar in nature. Where there are meaningful differences between species or stocks—as is the case of the North Atlantic right whale—they are included as separate subsections below. NMFS does not anticipate that serious injury or mortality would occur as a result from Vineyard Wind 1’s planned survey activities, even in the absence of mitigation, and no serious injury or mortality is authorized. As discussed in the **Potential Effects of Specified Activities on Marine Mammals and Their Habitat** section, non-auditory physical effects and vessel strike are not expected to occur. NMFS expects that all potential takes will be in the form

of short-term Level B behavioral harassment in the form of temporary avoidance of the area or decreased foraging (if such activity was occurring), reactions that are considered to be of low severity and with no lasting biological consequences (*e.g.*, Southall *et al.*, 2007). Even repeated Level B harassment of some small subset of an overall stock is unlikely to result in any significant realized decrease in viability for the affected individuals, and thus would not result in any adverse impact to the stock as a whole. As described above, Level A harassment is not expected to occur given the nature of the operations, the estimated size of the Level A harassment zones, and the required shutdown zones for certain activities.

In addition to being temporary, the maximum expected harassment zone around a survey vessel is 178 m. Although this distance is assumed for all survey activity in estimating take numbers authorized and evaluated here, in reality much of the survey activity will involve use of acoustic sources with smaller acoustic harassment zones, producing expected effects of particularly low severity. Therefore, the ensounded area surrounding each vessel is relatively small compared to the overall distribution of the animals in the area and their use of the habitat. Feeding behavior is not likely to be significantly impacted as prey species are mobile and are broadly distributed throughout the survey area; therefore, marine mammals that may be temporarily displaced during survey activities are expected to be able to resume foraging once they have moved away from areas with disturbing levels of underwater noise. Because of the temporary nature of the disturbance and the availability of similar habitat and resources in the surrounding area, the impacts to marine mammals and the food sources that they utilize are not expected to cause significant or long-term consequences for individual marine mammals or their populations.

There are no rookeries, mating or calving grounds known to be biologically important to marine mammals within the planned survey area. (Biologically important

areas for feeding and migration are discussed below.) There is no designated critical habitat for any ESA-listed marine mammals in the planned survey area.

North Atlantic Right Whales

The status of the North Atlantic right whale population is of heightened concern and, therefore, merits additional analysis. As noted previously, elevated North Atlantic right whale mortalities began in June 2017 and there is an active UME. Overall, preliminary findings support human interactions, specifically vessel strikes and entanglements, as the cause of death for the majority of right whales.

As noted previously, the planned project area overlaps a migratory corridor BIA for North Atlantic right whales (March-April and November-December). In addition to the migratory BIA, Oleson *et al.* (2020) identified an area south of Martha's Vineyard and Nantucket, referred to as "South of the Islands," as a newer, year-round, core North Atlantic right whale foraging habitat. The South of the Islands area overlaps with most of Vineyard Wind 1's project area.

As stated previously, the largest Level B harassment isopleth for Vineyard Wind 1's survey is 178 m. Therefore, even if Vineyard Wind 1 operates multiple survey vessels concurrently in this area, the total area encompassed above the Level B harassment threshold will be minimal in comparison with the remaining South of the Islands feeding habitat, and habitat within the migratory corridor BIA available to North Atlantic right whales. Additionally, NMFS is also requiring Vineyard Wind 1 to limit the number of survey vessels operating concurrently in the lease area or export cable corridor (not including coastal and bay waters) to no more than three from January through April, when North Atlantic right whale densities are the highest. Given the factors discussed above, and the temporary nature of the surveys, right whale migration is not expected to be impacted by the planned survey, and feeding is not expected to be affected to a degree

that will affect North Atlantic right whale foraging success in the South of the Islands important feeding area.

No vessel strike is expected to occur during Vineyard Wind 1's planned activities, and required vessel strike avoidance measures will decrease risk of vessel strike, including during migration and feeding. HRG survey operations are required to maintain a 500 m EZ and shutdown if a North Atlantic right whale is sighted at or within the EZ. Regarding take by Level B harassment, the 500 m shutdown zone for right whales is conservative, considering the Level B harassment isopleth for the most impactful acoustic source (*i.e.*, boomer) is estimated to be 178 m. Therefore, this EZ minimizes the potential for behavioral harassment of this species. Additionally, as noted previously, Level A harassment take is not expected for any species, including North Atlantic right whales, given the small PTS zones associated with HRG equipment types planned for use.

The authorized Level B harassment takes of North Atlantic right whale are not expected to exacerbate or compound upon the ongoing UME. The limited North Atlantic right whale Level B harassment takes authorized are expected to be of a short duration, and given the number of estimated takes, repeated exposures of the same individual are not expected. Therefore, the takes are not expected to impact individual fitness or annual rates of recruitment or survival. Further, given the relatively small size of the ensonified area during surveys, it is unlikely that North Atlantic right whale prey availability will be adversely affected by HRG survey operations.

Biologically Important Area for Fin Whales

The planned project area overlaps with a feeding BIA for fin whales (March-October). The fin whale feeding BIA is large (2,933 km²), and the acoustic footprint of the planned survey is sufficiently small such that feeding opportunities for these whales will not be reduced appreciably. Any fin whales temporarily displaced from the planned survey area will be expected to have sufficient remaining feeding habitat available to

them, and will not be prevented from feeding in other areas within the biologically important feeding habitat. In addition, any displacement of fin whales from the BIA or interruption of foraging bouts would be expected to be temporary in nature. Therefore, we do not expect fin whales feeding within the feeding BIAs to be impacted by the planned survey to an extent that would affect fitness or reproduction.

Other Marine Mammal Species with Active UMEs

As noted previously, there are several active UMEs occurring in the vicinity of Vineyard Wind 1's planned survey area. Elevated humpback whale mortalities have occurred along the Atlantic coast from Maine through Florida since January 2016. Of the cases examined, approximately half had evidence of human interaction (vessel strike or entanglement). Despite the UME, the relevant population of humpback whales (the West Indies breeding population, or distinct population segment (DPS)) remains stable at approximately 12,000 individuals, and the authorized Level B harassment takes of humpback whale are not expected to exacerbate or compound the ongoing UME.

Beginning in January 2017, elevated minke whale strandings have occurred along the Atlantic coast from Maine through South Carolina, with highest numbers in Massachusetts, Maine, and New York. The likely population abundance is greater than 20,000 whales, and the authorized Level B harassment takes of minke whale are not expected to exacerbate or compound upon the ongoing UME.

Elevated numbers of harbor seal and gray seal mortalities were first observed in July 2018 and have occurred across Maine, New Hampshire, and Massachusetts. Based on tests conducted so far, the main pathogen found in the seals is phocine distemper virus, although additional testing to identify other factors that may be involved in this UME are underway. The authorized Level B harassment takes of harbor seal and gray seal are not expected to exacerbate or compound upon the ongoing UME. For harbor seals, the population abundance is over 75,000 and annual M/SI (350) is well below PBR

(2,006) (Hayes *et al.*, 2020). The population abundance for gray seals in the United States is over 27,000, with an estimated abundance, including seals in Canada, of approximately 450,000. In addition, the abundance of gray seals is likely increasing in the U.S. Atlantic as well as in Canada (Hayes *et al.*, 2020).

The required mitigation measures are expected to reduce the number and/or severity of takes for all species listed in Table 2, including those with active UMEs, to the level of least practicable adverse impact. In particular they will provide animals the opportunity to move away from the sound source throughout the survey area before HRG survey equipment reaches full energy, thus preventing them from being exposed to sound levels that have the potential to cause injury (Level A harassment) or more severe Level B harassment. No Level A harassment is anticipated, even in the absence of mitigation measures, or authorized.

NMFS expects that takes will be in the form of short-term Level B behavioral harassment by way of brief startling reactions and/or temporary vacating of the area, or decreased foraging (if such activity was occurring)—reactions that (at the scale and intensity anticipated here) are considered to be of low severity, with no lasting biological consequences. Since both the sources and marine mammals are mobile, animals will only be exposed briefly to a small ensonified area that might result in take. Additionally, required mitigation measures will further reduce exposure to sound that could result in more severe behavioral harassment.

In summary and as described above, the following factors primarily support our determination that the impacts resulting from this activity are not expected to adversely affect the species or stock through effects on annual rates of recruitment or survival:

- No mortality or serious injury is anticipated or authorized;
- No Level A harassment (PTS) is anticipated, even in the absence of mitigation measures, or authorized;

- Foraging success is not likely to be significantly impacted as effects on species that serve as prey species for marine mammals from the survey are expected to be minimal;
- The availability of alternate areas of similar habitat value for marine mammals to temporarily vacate the survey area during the planned survey to avoid exposure to sounds from the activity;
- Take is anticipated to be primarily Level B behavioral harassment consisting of brief startling reactions and/or temporary avoidance of the survey area;
- While the survey area overlaps areas noted as a migratory BIA for North Atlantic right whales, the activities will occur in such a comparatively small area such that any avoidance of the survey area due to activities will not affect migration. In addition, mitigation measures to shutdown at 500 m to minimize potential for Level B behavioral harassment will limit any take of the species;
- Similarly, due to the relatively small footprint of the survey activities in relation to the size of the fin whale feeding BIA and South of the Islands North Atlantic right whale feeding area, the survey activities will not affect foraging success of these species; and
- The required mitigation measures, including visual monitoring and shutdowns, are expected to minimize potential impacts to marine mammals.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the monitoring and mitigation measures, NMFS finds that the total marine mammal take from Vineyard Wind 1's planned HRG survey activities will have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

As noted above, only small numbers of incidental take may be authorized under sections 101(a)(5)(A) and (D) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers and so, in practice, where estimated numbers are available, NMFS compares the number of individuals taken to the most appropriate estimation of abundance of the relevant species or stock in our determination of whether an authorization is limited to small numbers of marine mammals. When the predicted number of individuals to be taken is fewer than one third of the species or stock abundance, the take is considered to be of small numbers. Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

Take of all species or stocks is below one third of the estimated stock abundance (in fact, take of individuals is less than 3 percent of the abundance for all affected stocks) as shown in Table 4. Based on the analysis contained herein of the planned activity (including the mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS finds that small numbers of marine mammals will be taken relative to the population size of the affected species or stocks.

Unmitigable Adverse Impact Analysis and Determination

There are no relevant subsistence uses of the affected marine mammal stocks or species implicated by this action. Therefore, NMFS has determined that the total taking of affected species or stocks will not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence purposes.

National Environmental Policy Act

To comply with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq.*) and NOAA Administrative Order (NAO) 216-6A, NMFS must evaluate our proposed action (*i.e.*, the issuance of the incidental take authorization) and alternatives with respect to potential impacts on the human environment.

This action is consistent with categories of activities identified in Categorical Exclusion B4 of the Companion Manual for NAO 216-6A, which do not individually or cumulatively have the potential for significant impacts on the quality of the human environment and for which we have not identified any extraordinary circumstances that would preclude this categorical exclusion. Accordingly, NMFS has determined that this action qualifies to be categorically excluded from further NEPA review.

Endangered Species Act

Section 7(a)(2) of the Endangered Species Act of 1973 (ESA: 16 U.S.C. 1531 *et seq.*) requires that each Federal agency insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. To ensure ESA compliance for the issuance of IHAs, NMFS consults internally whenever we propose to authorize take for endangered or threatened species, in this case with NMFS GARFO.

The NMFS OPR is authorizing the incidental take of fin whale, North Atlantic right whale, sei whale, and sperm whale, which are listed under the ESA. We requested initiation of consultation under section 7 of the ESA with NMFS GARFO for issuance of this IHA. On July 13, 2021, NMFS GARFO determined that OPR's issuance of an IHA to Vineyard Wind 1 would be covered under the June 29, 2021 programmatic consultation, and that issuance of the IHA is not likely to adversely affect fin whale, North Atlantic right whale, sei whale, and sperm whale or the critical habitat of any ESA-listed species or result in the take of any marine mammals in violation of the ESA.

Authorization

NMFS has issued an IHA to Vineyard Wind 1 for the potential harassment of small numbers of 14 marine mammal species incidental to conducting marine site characterization surveys offshore of Massachusetts and Rhode Island in the area of

Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf Lease Area OCS-A 0501 and along the Offshore Export Cable Corridor provided the previously mentioned mitigation, monitoring and reporting requirements are followed.

Dated: July 22, 2021.

Angela Somma,

Acting Director, Office of Protected Resources,

National Marine Fisheries Service.

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